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(54) Title: SINGLE NUCLEOTIDE POLYMORPHISMS IN GENES

(57) Abstract: The invention provides nucleic acid segments of the human genome, particularly nucleic acid segments from a gene, including polymorphic sites. Allele-specific primers and probes hybridizing to regions flanking or containing these sites are also provided. The nucleic acids, primers and probes are used in applications such as phenotype correlations, forensics, paternity testing, medicine and genetic analysis. A role for the thrombospondin gene(s) in vascular disease is also disclosed. Use of single nucleotide polymorphisms in the thrombospondin gene(s) for diagnosis, prediction of clinical course and treatment response, development of therapeutics and development of cell-culture-based and animal models for research and treatment are disclosed.

## SINGLE NUCLEOTIDE POLYMORPHISMS IN GENES

## BACKGROUND OF THE INVENTION

The genomes of all organisms undergo spontaneous mutation in the course of their continuing evolution, generating variant forms of progenitor nucleic acid sequences (Gusella, *Ann. Rev. Biochem.* 55, 831-854 (1986)). The variant form may confer an evolutionary advantage or disadvantage relative to a progenitor form, or may be neutral. In some instances, a variant form confers a lethal disadvantage and is not transmitted to subsequent generations of the organism. In other instances, a variant form confers an evolutionary advantage to the species and is eventually incorporated into the DNA of many or most members of the species and effectively becomes the progenitor form. In many instances, both progenitor and variant form(s) survive and co-exist in a species population. The coexistence of multiple forms of a sequence gives rise to polymorphisms.

Several different types of polymorphism have been reported. A restriction fragment length polymorphism (RFLP) is a variation in DNA sequence that alters the length of a restriction fragment (Botstein *et al.*, *Am. J. Hum. Genet.* 32, 314-331 (1980)). The restriction fragment length polymorphism may create or delete a restriction site, thus changing the length of the restriction fragment. RFLPs have been widely used in human and animal genetic analyses (see WO 90/13668; W090/11369; Donis-Keller, *Cell* 51, 319-337 (1987); Lander *et al.*, *Genetics* 121, 85-99 (1989)). When a heritable trait can be linked to a particular RFLP, the presence of the RFLP in an individual can be used to predict the likelihood that the animal will also exhibit the trait.

Other polymorphisms take the form of short tandem repeats (STRs) that include tandem di-, tri- and tetra-nucleotide repeated motifs. These tandem repeats are also referred to as variable number tandem repeat (VNTR) polymorphisms.

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VNTRs have been used in identity and paternity analysis (US 5,075,217; Armour *et al.*, *FEBS Lett.* 307, 113-115 (1992); Horn *et al.*, WO 91/14003; Jeffreys, EP 370,719), and in a large number of genetic mapping studies.

Other polymorphisms take the form of single nucleotide variations between  
5 individuals of the same species. Such polymorphisms are far more frequent than  
RFLPs, STRs and VNTRs. Some single nucleotide polymorphisms (SNP) occur in  
protein-coding nucleic acid sequences (coding sequence SNP (cSNP)), in which  
case, one of the polymorphic forms may give rise to the expression of a defective or  
otherwise variant protein and, potentially, a genetic disease. Examples of genes in  
10 which polymorphisms within coding sequences give rise to genetic disease include  
 $\beta$ -globin (sickle cell anemia), apoE4 (Alzheimer's Disease), Factor V Leiden  
(thrombosis), and CFTR (cystic fibrosis). cSNPs can alter the codon sequence of the  
gene and therefore specify an alternative amino acid. Such changes are called  
"missense" when another amino acid is substituted, and "nonsense" when the  
15 alternative codon specifies a stop signal in protein translation. When the cSNP does  
not alter the amino acid specified the cSNP is called "silent".

Other single nucleotide polymorphisms occur in noncoding regions. Some of  
these polymorphisms may also result in defective protein expression (e.g., as a result  
of defective splicing). Other single nucleotide polymorphisms have no phenotypic  
20 effects. Single nucleotide polymorphisms can be used in the same manner as  
RFLPs and VNTRs, but offer several advantages. Single nucleotide polymorphisms  
occur with greater frequency and are spaced more uniformly throughout the genome  
than other forms of polymorphism. The greater frequency and uniformity of single  
nucleotide polymorphisms means that there is a greater probability that such a  
25 polymorphism will be found in close proximity to a genetic locus of interest than  
would be the case for other polymorphisms. The different forms of characterized  
single nucleotide polymorphisms are often easier to distinguish than other types of  
polymorphism (e.g., by use of assays employing allele-specific hybridization probes  
or primers).

30 Only a small percentage of the total repository of polymorphisms in humans  
and other organisms has been identified. The limited number of polymorphisms  
identified to date is due to the large amount of work required for their detection by

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conventional methods. For example, a conventional approach to identifying polymorphisms might be to sequence the same stretch of DNA in a population of individuals by dideoxy sequencing. In this type of approach, the amount of work increases in proportion to both the length of sequence and the number of individuals in a population and becomes impractical for large stretches of DNA or large numbers of persons.

#### SUMMARY OF THE INVENTION

Work described herein pertains to the identification of polymorphisms which can predispose individuals to disease, by resequencing large numbers of genes in a large number of individuals. Various genes from a number of individuals have been resequenced as described herein, and SNPs in these genes have been discovered (see the Table and Fig. 3). Some of these SNPs are cSNPs which specify a different amino acid sequence, some of the SNPs are silent cSNPs and some of these cSNPs specify a stop signal in protein translation. Some of the identified SNPs were located in non-coding regions.

The invention relates to a gene which comprises a single nucleotide polymorphism at a specific location. In a particular embodiment the invention relates to the variant allele of a gene having a single nucleotide polymorphism, which variant allele differs from a reference allele by one nucleotide at the site(s) identified in the Table and Fig. 3. Complements of these nucleic acid sequences are also included. The nucleic acid molecules can be DNA or RNA, and can be double- or single-stranded. Nucleic acid molecules can be, for example, 5-10, 5-15, 10-20, 5-25, 10-30, 10-50 or 10-100 bases long.

The invention further provides allele-specific oligonucleotides that hybridize to the reference or variant allele of a gene comprising a single nucleotide polymorphism or to the complement thereof. These oligonucleotides can be probes or primers.

The invention further provides a method of analyzing a nucleic acid from an individual. The method determines which base is present at any one of the polymorphic sites shown in the Table and/or Fig. 3. Optionally, a set of bases occupying a set of the polymorphic sites shown in the Table and /or Fig. 3 is



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determined. This type of analysis can be performed on a number of individuals, who are tested for the presence of a disease phenotype. The presence or absence of disease phenotype is then correlated with a base or set of bases present at the polymorphic site or sites in the individuals tested.

- 5        Thus, the invention further relates to a method of predicting the presence, absence, likelihood of the presence or absence, or severity of a particular phenotype or disorder associated with a particular genotype. The method comprises obtaining a nucleic acid sample from an individual and determining the identity of one or more bases (nucleotides) at polymorphic sites of genes described herein, wherein the  
10       presence of a particular base is correlated with a specified phenotype or disorder, thereby predicting the presence, absence, likelihood of the presence or absence, or severity of the phenotype or disorder in the individual.

- The thrombospondins are a family of extracellular matrix (ECM) glycoproteins that modulate many cell behaviors including adhesion, migration, and  
15       proliferation. Thrombospondins (also known as thrombin sensitive proteins or TSPs) are large molecular weight glycoproteins composed of three identical disulfide-linked polypeptide chains. The results described herein also reveal an important association between alterations, particularly SNPs, in TSP genes, particularly TSP-1 and TSP-4, and vascular disease. In particular, SNPs in these  
20       genes which are associated with premature coronary artery disease (CAD)(or coronary heart disease) and myocardial infarction (MI) have been identified and represent a potentially vital marker of upstream biology influencing the complex process of atherosclerotic plaque generation and vulnerability.

- Thus, the invention relates to the TSP gene SNPs identified as described  
25       herein, both singly and in combination, as well as to the use of these SNPs, and others in TSP genes, particularly those nearby in linkage disequilibrium with these SNPs, for diagnosis, prediction of clinical course and treatment response for vascular disease, development of new treatments for vascular disease based upon comparison of the variant and normal versions of the gene or gene product, and  
30       development of cell-culture based and animal models for research and treatment of vascular disease. The invention further relates to novel compounds and

pharmaceutical compositions for use in the diagnosis and treatment of such disorders. In preferred embodiments, the vascular disease is CAD or MI.

The invention relates to isolated nucleic acid molecules comprising all or a portion of the variant allele of TSP-1 (e.g., as exemplified by SEQ ID NO: 1), and to  
5 isolated nucleic acid molecules comprising all or a portion of the variant allele of TSP-4 (e.g., as exemplified by SEQ ID NO: 3). Preferred portions are at least 10 contiguous nucleotides and comprise the polymorphic site, e.g., a portion of SEQ ID NO: 1 which is at least 10 contiguous nucleotides and comprises the "G" at position 2210, or a portion of SEQ ID NO: 3 which is at least 10 contiguous nucleotides and  
10 comprises the "C" at position 1186. The invention further relates to isolated gene products, e.g., polypeptides or proteins, which are encoded by a nucleic acid molecule comprising all or a portion of the variant allele of TSP-1 or TSP-4 (e.g., SEQ ID NO: 1 or SEQ ID NO: 3, respectively). The invention also relates to nucleic acid molecules which hybridize to and/or share identity with the variant  
15 alleles identified herein (or their complements) and which also comprise the variant nucleotide at the SNP site.

The invention further relates to isolated proteins or polypeptides comprising all or a portion of the variant amino acid sequence of TSP-1 (e.g., as exemplified by SEQ ID NO: 2), and to isolated proteins or polypeptides comprising all or a portion  
20 of the variant amino acid sequence of TSP-4 (e.g., as exemplified by SEQ ID NO: 4). Preferred polypeptides are at least 10 contiguous amino acids and comprise the polymorphic amino acid, e.g., a portion of SEQ ID NO: 2 which is at least 10 contiguous amino acids and comprises the serine at residue 700, or a portion of SEQ ID NO: 4 which is at least 10 contiguous amino acids and comprises the proline at  
25 residue 387. The invention further relates to isolated nucleic acid molecules encoding such proteins and polypeptides, as well as to antibodies which bind, e.g., specifically, to such proteins and polypeptides.

The invention further relates to a method of diagnosing or aiding in the diagnosis of a disorder associated with the presence of one or more of (a) a G at  
30 nucleotide position 2210 of SEQ ID NO: 1; or (b) a C at nucleotide position 1186 of SEQ ID NO: 3 in an individual. The method comprises obtaining a nucleic acid sample from the individual and determining the nucleotide present at one or more of

the indicated nucleotide positions, wherein presence of one or more of (a) a G at nucleotide position 2210 of SEQ ID NO: 1; or (b) a C at nucleotide position 1186 of SEQ ID NO: 3 is indicative of increased likelihood of said disorder in the individual as compared with an appropriate control, *e.g.*, an individual having the reference  
5 nucleotide at one or more of said positions. In a particular embodiment the disorder is a vascular disease selected from the group consisting of atherosclerosis, coronary heart or artery disease, MI, stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism. In a preferred embodiment, the vascular disease is selected from the group consisting of CAD and MI.

10 The invention further relates to a method of diagnosing or aiding in the diagnosis of a disorder associated with one or more of (a) a G at nucleotide position 2210 of SEQ ID NO: 1; or (b) a C at nucleotide position 1186 of SEQ ID NO: 3 in an individual. The method comprises obtaining a nucleic acid sample from the individual and determining the nucleotide present at one or more of the indicated  
15 nucleotide positions, wherein presence of one or more of (a) an A at nucleotide position 2210 of SEQ ID NO: 1; or (b) a G at nucleotide position 1186 of SEQ ID NO: 3 is indicative of decreased likelihood of said disorder in the individual as compared with an appropriate control, *e.g.*, an individual having the variant nucleotide at said position. In a particular embodiment the disorder is a vascular  
20 disease selected from the group consisting of atherosclerosis, coronary heart or artery disease, MI, stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism. In a preferred embodiment, the vascular disease is selected from the group consisting of CAD and MI.

In one embodiment, the invention relates to a method for predicting the  
25 likelihood that an individual will have a vascular disease (or aiding in the diagnosis of a vascular disease), comprising the steps of obtaining a DNA sample from an individual to be assessed and determining the nucleotide present at one or more of nucleotide positions 2210 of SEQ ID NO: 1 or 1186 of SEQ ID NO: 3. The presence of the reference nucleotide at one or more of these positions indicates that  
30 the individual has a lower likelihood of having a vascular disease than an individual having the variant nucleotide at one or more of these positions, or a lower likelihood

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of having severe symptomology. In a particular embodiment, the individual is an individual at risk for development of a vascular disease.

The invention further relates to a method of diagnosing or aiding in the diagnosis of a disorder associated with the presence of one or more of (a) a serine at  
5 amino acid position 700 of SEQ ID NO: 2; or (b) a proline at amino acid position 387 of SEQ ID NO: 4 in an individual. The method comprises obtaining a biological sample containing the TSP-1 and/or TSP-4 protein or relevant portion thereof from the individual and determining the amino acid present at one or more of the indicated amino acid positions, wherein presence of one or more of (a) a serine at  
10 amino acid position 700 of SEQ ID NO: 2; or (b) a proline at amino acid position 387 of SEQ ID NO: 4 is indicative of increased likelihood of said disorder in the individual as compared with an appropriate control, *e.g.*, an individual having the reference amino acid at one or more of said positions.

The invention further relates to a method of diagnosing or aiding in the  
15 diagnosis of a disorder associated with one or more of (a) a serine at amino acid position 700 of SEQ ID NO: 2; or (b) a proline at amino acid position 387 of SEQ ID NO: 4 in an individual. The method comprises obtaining a biological sample containing the TSP-1 and/or TSP-4 protein or relevant portion thereof from the individual and determining the amino acid present at one or more of the indicated  
20 amino acid positions, wherein presence of one or more of (a) an asparagine at amino acid position 700 of SEQ ID NO: 2; or (b) an alanine at amino acid position 387 of SEQ ID NO: 4 is indicative of decreased likelihood of said disorder in the individual as compared with an appropriate control, *e.g.*, an individual having the variant amino acid at one or more of said positions.

25 In one embodiment, the invention relates to a method for predicting the likelihood that an individual will have a vascular disease (or aiding in the diagnosis of a vascular disease), comprising the steps of obtaining a biological sample comprising the TSP-1 and/or TSP-4 protein or relevant portion thereof from an individual to be assessed and determining the amino acid present at one or more of  
30 amino acid positions 700 of SEQ ID NO: 2 or 387 of SEQ ID NO: 4. The presence of the reference amino acid at one or more of these positions indicates that the individual has a lower likelihood of having a vascular disease than an individual

having the variant amino acid at one or more of these positions, or a lower likelihood of having severe symptomology. In a particular embodiment, the individual is an individual at risk for development of a vascular disease.

In another embodiment, the invention relates to pharmaceutical compositions comprising a reference TSP-1 and/or TSP-4 gene or gene product, or active portion thereof, for use in the treatment of vascular diseases. The invention further relates to the use of agonists and antagonists of TSP-1 and TSP-4 activity for use in the treatment of vascular diseases. In a particular embodiment the vascular disease is selected from the group consisting of atherosclerosis, coronary heart or artery disease, MI, stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism. In a preferred embodiment, the vascular disease is selected from the group consisting of CAD and MI.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Figs. 1A-1D show the reference nucleotide (SEQ ID NO: 1) and amino acid (SEQ ID NO: 2) sequences for TSP-1.

Figs. 2A-2C show the reference nucleotide (SEQ ID NO: 3) and amino acid (SEQ ID NO: 4) sequences for TSP-4.

Fig. 3 shows a table providing detailed information about the SNPs identified herein. Column one shows the internal polymorphism identifier. Column two shows the accession number for the reference sequence in the TIGR database ([http://www.tigr.org/tdb/hgi/searching/hgi\\_reports.html](http://www.tigr.org/tdb/hgi/searching/hgi_reports.html)). Column three shows the nucleotide position for the SNP site. Column four shows the gene in which the polymorphism was identified. Column five shows the polymorphic site and additional flanking sequence on each side of the polymorphism. Column six shows the type of mutation produced by the polymorphism. Columns seven and eight show the reference and alternate (variant) nucleotides, respectively, for the SNP. Columns nine and ten show the reference and alternate (variant) amino acids, respectively, encoded by the alleles of the gene.

## DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a gene which comprises a single nucleotide polymorphism (SNP) at a specific location. The gene which includes the SNP has at least two alleles, referred to herein as the reference allele and the variant allele. The reference allele (prototypical or wild type allele) has been designated arbitrarily and typically corresponds to the nucleotide sequence of the gene which has been deposited with GenBank or TIGR under a given Accession number. The variant allele differs from the reference allele by one nucleotide at the site(s) identified in the Table. The present invention also relates to variant alleles of the described genes and to complements of the variant alleles. The invention also relates to nucleic acid molecules which hybridize to and/or share identity with the variant alleles identified herein (or their complements) and which also comprise the variant nucleotide at the SNP site.

The invention further relates to portions of the variant alleles and portions of complements of the variant alleles which comprise (encompass) the site of the SNP and are at least 5 nucleotides in length. Portions can be, for example, 5-10, 5-15, 10-20, 5-25, 10-30, 10-50 or 10-100 bases long. For example, a portion of a variant allele which is 21 nucleotides in length includes the single nucleotide polymorphism (the nucleotide which differs from the reference allele at that site) and twenty additional nucleotides which flank the site in the variant allele. These nucleotides can be on one or both sides of the polymorphism. Polymorphisms which are the subject of this invention are defined in the Table with respect to the reference sequence deposited in GenBank or TIGR under the Accession number indicated. For example, the invention relates to a portion of a gene (e.g., AT3) having a nucleotide sequence as deposited in GenBank (e.g., U11270) comprising a single nucleotide polymorphism at a specific position (e.g., nucleotide 11918). The reference nucleotide for AT3 is shown in column 8, and the variant nucleotide is shown in column 9 of the Table. The nucleotide sequences of the invention can be double- or single-stranded.

The invention further provides allele-specific oligonucleotides that hybridize to the reference or variant allele of a gene comprising a single nucleotide

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polymorphism or to the complement thereof. These oligonucleotides can be probes or primers.

The invention further provides a method of analyzing a nucleic acid from an individual. The method determines which base is present at any one of the polymorphic sites shown in the Table and/or Fig. 3. Optionally, a set of bases occupying a set of the polymorphic sites shown in the Table and/or Fig. 3 is determined. This type of analysis can be performed on a number of individuals, who are tested for the presence of a disease phenotype. The presence or absence of disease phenotype is then correlated with a base or set of bases present at the polymorphic site or sites in the individuals tested.

Thus, the invention further relates to a method of predicting the presence, absence, likelihood of the presence or absence, or severity of a particular phenotype or disorder associated with a particular genotype. The method comprises obtaining a nucleic acid sample from an individual and determining the identity of one or more bases (nucleotides) at polymorphic sites of genes described herein, wherein the presence of a particular base is correlated with a specified phenotype or disorder, thereby predicting the presence, absence, likelihood of the presence or absence, or severity of the phenotype or disorder in the individual.

#### DEFINITIONS

A nucleic acid molecule or oligonucleotide can be DNA or RNA, and single- or double-stranded. Nucleic acid molecules and oligonucleotides can be naturally occurring or synthetic, but are typically prepared by synthetic means. Preferred nucleic acid molecules and oligonucleotides of the invention include segments of DNA, or their complements, which include any one of the polymorphic sites shown in the Table. The segments can be between 5 and 250 bases, and, in specific embodiments, are between 5-10, 5-20, 10-20, 10-50, 20-50 or 10-100 bases. For example, the segment can be 21 bases. The polymorphic site can occur within any position of the segment. The segments can be from any of the allelic forms of DNA shown in the Table.

As used herein, the terms "nucleotide", "base" and "nucleic acid" are intended to be equivalent. The terms "nucleotide sequence", "nucleic acid sequence", "nucleic acid molecule" and "segment" are intended to be equivalent.

Hybridization probes are oligonucleotides which bind in a base-specific manner to a complementary strand of nucleic acid. Such probes include peptide nucleic acids, as described in Nielsen *et al.*, *Science* 254, 1497-1500 (1991). Probes can be any length suitable for specific hybridization to the target nucleic acid sequence. The most appropriate length of the probe may vary depending upon the hybridization method in which it is being used; for example, particular lengths may be more appropriate for use in microfabricated arrays, while other lengths may be more suitable for use in classical hybridization methods. Such optimizations are known to the skilled artisan. Suitable probes and primers can range from about 5 nucleotides to about 30 nucleotides in length. For example, probes and primers can be 5, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 25, 26, 28 or 30 nucleotides in length. The probe or primer preferably overlaps at least one polymorphic site occupied by any of the possible variant nucleotides. The nucleotide sequence can correspond to the coding sequence of the allele or to the complement of the coding sequence of the allele.

As used herein, the term "primer" refers to a single-stranded oligonucleotide which acts as a point of initiation of template-directed DNA synthesis under appropriate conditions (*e.g.*, in the presence of four different nucleoside triphosphates and an agent for polymerization, such as DNA or RNA polymerase or reverse transcriptase) in an appropriate buffer and at a suitable temperature. The appropriate length of a primer depends on the intended use of the primer, but typically ranges from 15 to 30 nucleotides. Short primer molecules generally require cooler temperatures to form sufficiently stable hybrid complexes with the template. A primer need not reflect the exact sequence of the template, but must be sufficiently complementary to hybridize with a template. The term primer site refers to the area of the target DNA to which a primer hybridizes. The term primer pair refers to a set of primers including a 5' (upstream) primer that hybridizes with the 5' end of the DNA sequence to be amplified and a 3' (downstream) primer that hybridizes with the complement of the 3' end of the sequence to be amplified.



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As used herein, linkage describes the tendency of genes, alleles, loci or genetic markers to be inherited together as a result of their location on the same chromosome. It can be measured by percent recombination between the two genes, alleles, loci or genetic markers.

- 5       As used herein, polymorphism refers to the occurrence of two or more genetically determined alternative sequences or alleles in a population. A polymorphic marker or site is the locus at which divergence occurs. Preferred markers have at least two alleles, each occurring at frequency of greater than 1%, and more preferably greater than 10% or 20% of a selected population. A
- 10       polymorphic locus may be as small as one base pair. Polymorphic markers include restriction fragment length polymorphisms, variable number of tandem repeats (VNTR's), hypervariable regions, minisatellites, dinucleotide repeats, trinucleotide repeats, tetranucleotide repeats, simple sequence repeats, and insertion elements such as Alu. The first identified allelic form is arbitrarily designated as the reference
- 15       form and other allelic forms are designated as alternative or variant alleles. The allelic form occurring most frequently in a selected population is sometimes referred to as the wildtype form. Diploid organisms may be homozygous or heterozygous for allelic forms. A diallelic or biallelic polymorphism has two forms. A triallelic polymorphism has three forms.
- 20       Work described herein pertains to the resequencing of large numbers of genes in a large number of individuals to identify polymorphisms which can predispose individuals to disease. For example, polymorphisms in genes which are expressed in liver may predispose individuals to disorders of the liver. By altering amino acid sequence, SNPs may alter the function of the encoded proteins. The discovery of
- 25       the SNP facilitates biochemical analysis of the variants and the development of assays to characterize the variants and to screen for pharmaceutical that would interact directly with one or another form of the protein. SNPs (including silent SNPs) also enable the development of specific DNA, RNA, or protein-based diagnostics that detect the presence or absence of the polymorphism in particular
- 30       conditions.

A single nucleotide polymorphism occurs at a polymorphic site occupied by a single nucleotide, which is the site of variation between allelic sequences. The site

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is usually preceded by and followed by highly conserved sequences of the allele (e.g., sequences that vary in less than 1/100 or 1/1000 members of the populations).

A single nucleotide polymorphism usually arises due to substitution of one nucleotide for another at the polymorphic site. A transition is the replacement of  
5 one purine by another purine or one pyrimidine by another pyrimidine. A transversion is the replacement of a purine by a pyrimidine or vice versa. Single nucleotide polymorphisms can also arise from a deletion of a nucleotide or an insertion of a nucleotide relative to a reference allele. Typically the polymorphic site is occupied by a base other than the reference base. For example, where the  
10 reference allele contains the base "T" at the polymorphic site, the altered allele can contain a "C", "G" or "A" at the polymorphic site.

The invention also relates to nucleic acid molecules which hybridize to the variant alleles identified herein (or their complements) and which also comprise the variant nucleotide at the SNP site. Hybridizations are usually performed under  
15 stringent conditions, for example, at a salt concentration of no more than 1 M and a temperature of at least 25°C. For example, conditions of 5X SSPE (750 mM NaCl, 50 mM NaPhosphate, 5 mM EDTA, pH 7.4) and a temperature of 25-30°C, or equivalent conditions, are suitable for allele-specific probe hybridizations. Equivalent conditions can be determined by varying one or more of the parameters  
20 given as an example, as known in the art, while maintaining a similar degree of identity or similarity between the target nucleotide sequence and the primer or probe used.

The invention also relates to nucleic acid molecules which share substantial sequence identity to the variant alleles identified herein (or their complements) and  
25 which also comprise the variant nucleotide at the SNP site. Particularly preferred are nucleic acid molecules and fragments which have at least about 60%, preferably at least about 70, 80 or 85%, more preferably at least about 90%, even more preferably at least about 95%, and most preferably at least about 98% identity with nucleic acid molecules described herein. The percent identity of two nucleotide or  
30 amino acid sequences can be determined by aligning the sequences for optimal comparison purposes (e.g., gaps can be introduced in the sequence of a first sequence). The nucleotides or amino acids at corresponding positions are then

compared, and the percent identity between the two sequences is a function of the number of identical positions shared by the sequences (*i.e.*, % identity = # of identical positions/total # of positions x 100). In certain embodiments, the length of a sequence aligned for comparison purposes is at least 30%, preferably at least 40%,  
5 more preferably at least 60%, and even more preferably at least 70%, 80% or 90% of the length of the reference sequence. The actual comparison of the two sequences can be accomplished by well-known methods, for example, using a mathematical algorithm. A preferred, non-limiting example of such a mathematical algorithm is described in Karlin *et al.*, *Proc. Natl. Acad. Sci. USA*, 90:5873-5877 (1993). Such  
10 an algorithm is incorporated into the NBLAST and XBLAST programs (version 2.0) as described in Altschul *et al.*, *Nucleic Acids Res.*, 25:389-3402 (1997). When utilizing BLAST and Gapped BLAST programs, the default parameters of the respective programs (*e.g.*, NBLAST) can be used. See <http://www.ncbi.nlm.nih.gov>. In one embodiment, parameters for sequence  
15 comparison can be set at score=100, wordlength=12, or can be varied (*e.g.*, W=5 or W=20).

The term "isolated" is used herein to indicate that the material in question exists in a physical milieu distinct from that in which it occurs in nature. For example, an isolated nucleic acid of the invention may be substantially isolated with  
20 respect to the complex cellular milieu in which it naturally occurs. In some instances, the isolated material will form part of a composition (for example, a crude extract containing other substances), buffer system or reagent mix. In other circumstance, the material may be purified to essential homogeneity, for example as determined by PAGE or column chromatography such as HPLC. Preferably, an  
25 isolated nucleic acid comprises at least about 50, 80 or 90 percent (on a molar basis) of all macromolecular species present.

#### I. Novel Polymorphisms of the Invention

Some of the novel polymorphisms of the invention are shown in the Table. Columns one and two show designations for the indicated polymorphism. Column  
30 three shows the Genbank or TIGR Accession number for the wild type (or reference) allele. Column four shows the location of the polymorphic site in the nucleic acid

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sequence with reference to the Genbank or TIGR sequence shown in column three. Column five shows common names for the gene in which the polymorphism is located. Column six shows the polymorphism and a portion of the 3' and 5' flanking sequence of the gene. Column seven shows the type of mutation; N, non-sense, S, 5 silent, M, missense. Columns eight and nine show the reference and alternate nucleotides, respectively, at the polymorphic site. Columns ten and eleven show the reference and alternate amino acids, respectively, encoded by the reference and variant, respectively, alleles. Other novel polymorphisms of the invention are shown in Fig. 3.

## 10 II. Analysis of Polymorphisms

### A. Preparation of Samples

Polymorphisms are detected in a target nucleic acid from an individual being analyzed. For assay of genomic DNA, virtually any biological sample (other than pure red blood cells) is suitable. For example, convenient tissue samples include 15 whole blood, semen, saliva, tears, urine, fecal material, sweat, buccal, skin and hair. For assay of cDNA or mRNA, the tissue sample must be obtained from an organ in which the target nucleic acid is expressed. For example, if the target nucleic acid is a cytochrome P450, the liver is a suitable source.

Many of the methods described below require amplification of DNA from 20 target samples. This can be accomplished by e.g., PCR. *See generally PCR Technology: Principles and Applications for DNA Amplification* (ed. H.A. Erlich, Freeman Press, NY, NY, 1992); *PCR Protocols: A Guide to Methods and Applications* (eds. Innis, *et al.*, Academic Press, San Diego, CA, 1990); Mattila *et al.*, *Nucleic Acids Res.* 19, 4967 (1991); Eckert *et al.*, *PCR Methods and Applications* 1, 17 (1991); *PCR* (eds. McPherson *et al.*, IRL Press, Oxford); and 25 U.S. Patent 4,683,202.

Other suitable amplification methods include the ligase chain reaction (LCR) (see Wu and Wallace, *Genomics* 4, 560 (1989), Landegren *et al.*, *Science* 241, 1077 (1988), transcription amplification (Kwoh *et al.*, *Proc. Natl. Acad. Sci. USA* 86, 30 1173 (1989)), and self-sustained sequence replication (Guatelli *et al.*, *Proc. Nat. Acad. Sci. USA*, 87, 1874 (1990)) and nucleic acid based sequence amplification

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(NASBA). The latter two amplification methods involve isothermal reactions based on isothermal transcription, which produce both single stranded RNA (ssRNA) and double stranded DNA (dsDNA) as the amplification products in a ratio of about 30 or 100 to 1, respectively.

## 5        B. Detection of Polymorphisms in Target DNA

There are two distinct types of analysis of target DNA for detecting polymorphisms. The first type of analysis, sometimes referred to as *de novo* characterization, is carried out to identify polymorphic sites not previously characterized (i.e., to identify new polymorphisms). This analysis compares target  
10 sequences in different individuals to identify points of variation, i.e., polymorphic sites. By analyzing groups of individuals representing the greatest ethnic diversity among humans and greatest breed and species variety in plants and animals, patterns characteristic of the most common alleles/haplotypes of the locus can be identified, and the frequencies of such alleles/haplotypes in the population can be determined.  
15 Additional allelic frequencies can be determined for subpopulations characterized by criteria such as geography, race, or gender. The *de novo* identification of polymorphisms of the invention is described in the Examples section. The second type of analysis determines which form(s) of a characterized (known) polymorphism are present in individuals under test. There are a variety of suitable procedures,  
20 which are discussed in turn.

### 1. Allele-Specific Probes

The design and use of allele-specific probes for analyzing polymorphisms is described by e.g., Saiki *et al.*, *Nature* 324, 163-166 (1986); Dattagupta, EP 235,726, Saiki, WO 89/11548. Allele-specific probes can be designed that hybridize to a  
25 segment of target DNA from one individual but do not hybridize to the corresponding segment from another individual due to the presence of different polymorphic forms in the respective segments from the two individuals. Hybridization conditions should be sufficiently stringent that there is a significant difference in hybridization intensity between alleles, and preferably an essentially  
30 binary response, whereby a probe hybridizes to only one of the alleles. Some probes

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are designed to hybridize to a segment of target DNA such that the polymorphic site aligns with a central position (e.g., in a 15-mer at the 7 position; in a 16-mer, at either the 8 or 9 position) of the probe. This design of probe achieves good discrimination in hybridization between different allelic forms.

- 5        Allele-specific probes are often used in pairs, one member of a pair showing a perfect match to a reference form of a target sequence and the other member showing a perfect match to a variant form. Several pairs of probes can then be immobilized on the same support for simultaneous analysis of multiple polymorphisms within the same target sequence.

10        2. Tiling Arrays

- The polymorphisms can also be identified by hybridization to nucleic acid arrays, some examples of which are described in WO 95/11995. One form of such arrays is described in the Examples section in connection with de novo identification of polymorphisms. The same array or a different array can be used for analysis of
- 15       characterized polymorphisms. WO 95/11995 also describes subarrays that are optimized for detection of a variant form of a precharacterized polymorphism. Such a subarray contains probes designed to be complementary to a second reference sequence, which is an allelic variant of the first reference sequence. The second group of probes is designed by the same principles as described in the Examples,
- 20       except that the probes exhibit complementarity to the second reference sequence. The inclusion of a second group (or further groups) can be particularly useful for analyzing short subsequences of the primary reference sequence in which multiple mutations are expected to occur within a short distance commensurate with the length of the probes (e.g., two or more mutations within 9 to 21 bases).

25        3. Allele-Specific Primers

- An allele-specific primer hybridizes to a site on target DNA overlapping a polymorphism and only primes amplification of an allelic form to which the primer exhibits perfect complementarity. See Gibbs, *Nucleic Acid Res.* 17, 2427-2448 (1989). This primer is used in conjunction with a second primer which hybridizes at
- 30       a distal site. Amplification proceeds from the two primers, resulting in a detectable

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product which indicates the particular allelic form is present. A control is usually performed with a second pair of primers, one of which shows a single base mismatch at the polymorphic site and the other of which exhibits perfect complementarity to a distal site. The single-base mismatch prevents amplification and no detectable product is formed. The method works best when the mismatch is included in the 3'-most position of the oligonucleotide aligned with the polymorphism because this position is most destabilizing to elongation from the primer (see, e.g., WO 93/22456).

#### 4. Direct-Sequencing

The direct analysis of the sequence of polymorphisms of the present invention can be accomplished using either the dideoxy chain termination method or the Maxam Gilbert method (see Sambrook *et al.*, *Molecular Cloning, A Laboratory Manual* (2nd Ed., CSHP, New York 1989); Zyskind *et al.*, *Recombinant DNA Laboratory Manual*, (Acad. Press, 1988)).

#### 5. Denaturing Gradient Gel Electrophoresis

Amplification products generated using the polymerase chain reaction can be analyzed by the use of denaturing gradient gel electrophoresis. Different alleles can be identified based on the different sequence-dependent melting properties and electrophoretic migration of DNA in solution. Erlich, ed., *PCR Technology, Principles and Applications for DNA Amplification*, (W.H. Freeman and Co, New York, 1992), Chapter 7.

#### 6. Single-Strand Conformation Polymorphism Analysis

Alleles of target sequences can be differentiated using single-strand conformation polymorphism analysis, which identifies base differences by alteration in electrophoretic migration of single stranded PCR products, as described in Orita *et al.*, *Proc. Nat. Acad. Sci.* 86, 2766-2770 (1989). Amplified PCR products can be generated as described above, and heated or otherwise denatured, to form single stranded amplification products. Single-stranded nucleic acids may refold or form secondary structures which are partially dependent on the base sequence. The

different electrophoretic mobilities of single-stranded amplification products can be related to base-sequence differences between alleles of target sequences.

### 7. Single-Base Extension

An alternative method for identifying and analyzing polymorphisms is based on single-base extension (SBE) of a fluorescently-labeled primer coupled with fluorescence resonance energy transfer (FRET) between the label of the added base and the label of the primer. Typically, the method, such as that described by Chen *et al.*, (*PNAS* 94:10756-61 (1997), incorporated herein by reference) uses a locus-specific oligonucleotide primer labeled on the 5' terminus with 5-carboxyfluorescein (FAM). This labeled primer is designed so that the 3' end is immediately adjacent to the polymorphic site of interest. The labeled primer is hybridized to the locus, and single base extension of the labeled primer is performed with fluorescently labeled dideoxynucleotides (ddNTPs) in dye-terminator sequencing fashion, except that no deoxynucleotides are present. An increase in fluorescence of the added ddNTP in response to excitation at the wavelength of the labeled primer is used to infer the identity of the added nucleotide.

### III. Methods of Use

After determining polymorphic form(s) present in an individual at one or more polymorphic sites, this information can be used in a number of methods.

#### 20 A. Forensics

Determination of which polymorphic forms occupy a set of polymorphic sites in an individual identifies a set of polymorphic forms that distinguishes the individual. See generally National Research Council, *The Evaluation of Forensic DNA Evidence* (Eds. Pollard *et al.*, National Academy Press, DC, 1996). The more sites that are analyzed, the lower the probability that the set of polymorphic forms in one individual is the same as that in an unrelated individual. Preferably, if multiple sites are analyzed, the sites are unlinked. Thus, polymorphisms of the invention are often used in conjunction with polymorphisms in distal genes. Preferred polymorphisms for use in forensics are biallelic because the population frequencies



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of two polymorphic forms can usually be determined with greater accuracy than those of multiple polymorphic forms at multi-allelic loci.

The capacity to identify a distinguishing or unique set of forensic markers in an individual is useful for forensic analysis. For example, one can determine whether a blood sample from a suspect matches a blood or other tissue sample from a crime scene by determining whether the set of polymorphic forms occupying selected polymorphic sites is the same in the suspect and the sample. If the set of polymorphic markers does not match between a suspect and a sample, it can be concluded (barring experimental error) that the suspect was not the source of the sample. If the set of markers does match, one can conclude that the DNA from the suspect is consistent with that found at the crime scene. If frequencies of the polymorphic forms at the loci tested have been determined (e.g., by analysis of a suitable population of individuals), one can perform a statistical analysis to determine the probability that a match of suspect and crime scene sample would occur by chance.

$p(\text{ID})$  is the probability that two random individuals have the same polymorphic or allelic form at a given polymorphic site. In biallelic loci, four genotypes are possible: AA, AB, BA, and BB. If alleles A and B occur in a haploid genome of the organism with frequencies  $x$  and  $y$ , the probability of each genotype in a diploid organism is (see WO 95/12607):

$$\text{Homozygote: } p(\text{AA}) = x^2$$

$$\text{Homozygote: } p(\text{BB}) = y^2 = (1-x)^2$$

$$\text{Single Heterozygote: } p(\text{AB}) = p(\text{BA}) = xy = x(1-x)$$

$$\text{Both Heterozygotes: } p(\text{AB} + \text{BA}) = 2xy = 2x(1-x)$$

The probability of identity at one locus (i.e., the probability that two individuals, picked at random from a population will have identical polymorphic forms at a given locus) is given by the equation:

$$p(\text{ID}) = (x^2)^2 + (2xy)^2 + (y^2)^2.$$

These calculations can be extended for any number of polymorphic forms at a given locus. For example, the probability of identity  $p(\text{ID})$  for a 3-allele system

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where the alleles have the frequencies in the population of  $x$ ,  $y$  and  $z$ , respectively, is equal to the sum of the squares of the genotype frequencies:

$$p(\text{ID}) = x^4 + (2xy)^2 + (2yz)^2 + (2xz)^2 + z^4 + y^4$$

In a locus of  $n$  alleles, the appropriate binomial expansion is used to calculate  
5  $p(\text{ID})$  and  $p(\text{exc})$ .

The cumulative probability of identity ( $\text{cum } p(\text{ID})$ ) for each of multiple unlinked loci is determined by multiplying the probabilities provided by each locus.

$$\text{cum } p(\text{ID}) = p(\text{ID}1)p(\text{ID}2)p(\text{ID}3)\dots p(\text{ID}n)$$

The cumulative probability of non-identity for  $n$  loci (i.e. the probability that  
10 two random individuals will be different at 1 or more loci) is given by the equation:

$$\text{cum } p(\text{nonID}) = 1 - \text{cum } p(\text{ID}).$$

If several polymorphic loci are tested, the cumulative probability of non-identity for random individuals becomes very high (e.g., one billion to one). Such probabilities can be taken into account together with other evidence in determining  
15 the guilt or innocence of the suspect.

#### B. Paternity Testing

The object of paternity testing is usually to determine whether a male is the father of a child. In most cases, the mother of the child is known and thus, the mother's contribution to the child's genotype can be traced. Paternity testing  
20 investigates whether the part of the child's genotype not attributable to the mother is consistent with that of the putative father. Paternity testing can be performed by analyzing sets of polymorphisms in the putative father and the child.

If the set of polymorphisms in the child attributable to the father does not match the set of polymorphisms of the putative father, it can be concluded, barring  
25 experimental error, that the putative father is not the real father. If the set of polymorphisms in the child attributable to the father does match the set of polymorphisms of the putative father, a statistical calculation can be performed to determine the probability of coincidental match.

The probability of parentage exclusion (representing the probability that a  
30 random male will have a polymorphic form at a given polymorphic site that makes him incompatible as the father) is given by the equation (see WO 95/12607):

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$$p(\text{exc}) = xy(1-xy)$$

where x and y are the population frequencies of alleles A and B of a biallelic polymorphic site.

$$(\text{At a triallelic site } p(\text{exc}) = xy(1-xy) + yz(1-yz) + xz(1-xz) + 3xyz(1-xyz)),$$

5 where x, y and z are the respective population frequencies of alleles A, B and C).

The probability of non-exclusion is

$$p(\text{non-exc}) = 1 - p(\text{exc})$$

The cumulative probability of non-exclusion (representing the value obtained when n loci are used) is thus:

$$10 \quad \text{cum } p(\text{non-exc}) = p(\text{non-exc1})p(\text{non-exc2})p(\text{non-exc3})\dots p(\text{non-exc}n)$$

The cumulative probability of exclusion for n loci (representing the probability that a random male will be excluded)

$$\text{cum } p(\text{exc}) = 1 - \text{cum } p(\text{non-exc}).$$

If several polymorphic loci are included in the analysis, the cumulative  
15 probability of exclusion of a random male is very high. This probability can be taken into account in assessing the liability of a putative father whose polymorphic marker set matches the child's polymorphic marker set attributable to his/her father.

### C. Correlation of Polymorphisms with Phenotypic Traits

The polymorphisms of the invention may contribute to the phenotype of an  
20 organism in different ways. Some polymorphisms occur within a protein coding sequence and contribute to phenotype by affecting protein structure. The effect may be neutral, beneficial or detrimental, or both beneficial and detrimental, depending on the circumstances. For example, a heterozygous sickle cell mutation confers resistance to malaria, but a homozygous sickle cell mutation is usually lethal. Other  
25 polymorphisms occur in noncoding regions but may exert phenotypic effects indirectly via influence on replication, transcription, and translation. A single polymorphism may affect more than one phenotypic trait. Likewise, a single phenotypic trait may be affected by polymorphisms in different genes. Further, some polymorphisms predispose an individual to a distinct mutation that is causally  
30 related to a certain phenotype.

Phenotypic traits include diseases that have known but hitherto unmapped genetic components (e.g., agammaglobulinemia, diabetes insipidus, Lesch-Nyhan syndrome, muscular dystrophy, Wiskott-Aldrich syndrome, Fabry's disease, familial hypercholesterolemia, polycystic kidney disease, hereditary spherocytosis, von Willebrand's disease, tuberous sclerosis, hereditary hemorrhagic telangiectasia, familial colonic polyposis, Ehlers-Danlos syndrome, osteogenesis imperfecta, and acute intermittent porphyria). Phenotypic traits also include symptoms of, or susceptibility to, multifactorial diseases of which a component is or may be genetic, such as autoimmune diseases, inflammation, cancer, diseases of the nervous system, and infection by pathogenic microorganisms. Some examples of autoimmune diseases include rheumatoid arthritis, multiple sclerosis, diabetes (insulin-dependent and non-independent), systemic lupus erythematosus and Graves disease. Some examples of cancers include cancers of the bladder, brain, breast, colon, esophagus, kidney, leukemia, liver, lung, oral cavity, ovary, pancreas, prostate, skin, stomach and uterus. Phenotypic traits also include characteristics such as longevity, appearance (e.g., baldness, obesity), strength, speed, endurance, fertility, and susceptibility or receptivity to particular drugs or therapeutic treatments.

The correlation of one or more polymorphisms with phenotypic traits can be facilitated by knowledge of the gene product of the wild type (reference) gene. The genes in which cSNPs of the present invention have been identified are genes which have been previously sequenced and characterized in one of their allelic forms.

Correlation is performed for a population of individuals who have been tested for the presence or absence of a phenotypic trait of interest and for polymorphic markers sets. To perform such analysis, the presence or absence of a set of polymorphisms (i.e. a polymorphic set) is determined for a set of the individuals, some of whom exhibit a particular trait, and some of which exhibit lack of the trait. The alleles of each polymorphism of the set are then reviewed to determine whether the presence or absence of a particular allele is associated with the trait of interest. Correlation can be performed by standard statistical methods such as a  $\chi^2$ -squared test and statistically significant correlations between polymorphic form(s) and phenotypic characteristics are noted. For example, it might be found that the presence of allele A1 at polymorphism A correlates with heart disease. As a further

example, it might be found that the combined presence of allele A1 at polymorphism A and allele B1 at polymorphism B correlates with increased milk production of a farm animal.

Such correlations can be exploited in several ways. In the case of a strong correlation between a set of one or more polymorphic forms and a disease for which treatment is available, detection of the polymorphic form set in a human or animal patient may justify immediate administration of treatment, or at least the institution of regular monitoring of the patient. Detection of a polymorphic form correlated with serious disease in a couple contemplating a family may also be valuable to the couple in their reproductive decisions. For example, the female partner might elect to undergo *in vitro* fertilization to avoid the possibility of transmitting such a polymorphism from her husband to her offspring. In the case of a weaker, but still statistically significant correlation between a polymorphic set and human disease, immediate therapeutic intervention or monitoring may not be justified. Nevertheless, the patient can be motivated to begin simple life-style changes (e.g., diet, exercise) that can be accomplished at little cost to the patient but confer potential benefits in reducing the risk of conditions to which the patient may have increased susceptibility by virtue of variant alleles. Identification of a polymorphic set in a patient correlated with enhanced receptiveness to one of several treatment regimes for a disease indicates that this treatment regime should be followed.

For animals and plants, correlations between characteristics and phenotype are useful for breeding for desired characteristics. For example, Beitz *et al.*, US 5,292,639 discuss use of bovine mitochondrial polymorphisms in a breeding program to improve milk production in cows. To evaluate the effect of mtDNA D-loop sequence polymorphism on milk production, each cow was assigned a value of 1 if variant or 0 if wildtype with respect to a prototypical mitochondrial DNA sequence at each of 17 locations considered. Each production trait was analyzed individually with the following animal model:

$$Y_{ijkpn} = \mu + YS_i + P_j + X_k + \beta_1 + \dots \beta_{17} + PE_n + a_n + e_p$$

where  $Y_{ijkpn}$  is the milk, fat, fat percentage, SNF, SNF percentage, energy concentration, or lactation energy record;  $\mu$  is an overall mean;  $YS_i$  is the effect common to all cows calving in year-season;  $X_k$  is the effect common to cows in

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either the high or average selection line;  $\beta_1$  to  $\beta_{17}$  are the binomial regressions of production record on mtDNA D-loop sequence polymorphisms;  $PE_n$  is permanent environmental effect common to all records of cow  $n$ ;  $a_n$  is effect of animal  $n$  and is composed of the additive genetic contribution of sire and dam breeding values and a Mendelian sampling effect; and  $e_p$  is a random residual. It was found that eleven of seventeen polymorphisms tested influenced at least one production trait. Bovines having the best polymorphic forms for milk production at these eleven loci are used as parents for breeding the next generation of the herd.

#### D. Genetic Mapping of Phenotypic Traits

The previous section concerns identifying correlations between phenotypic traits and polymorphisms that directly or indirectly contribute to those traits. The present section describes identification of a physical linkage between a genetic locus associated with a trait of interest and polymorphic markers that are not associated with the trait, but are in physical proximity with the genetic locus responsible for the trait and co-segregate with it. Such analysis is useful for mapping a genetic locus associated with a phenotypic trait to a chromosomal position, and thereby cloning gene(s) responsible for the trait. See Lander *et al.*, *Proc. Natl. Acad. Sci. (USA)* 83, 7353-7357 (1986); Lander *et al.*, *Proc. Natl. Acad. Sci. (USA)* 84, 2363-2367 (1987); Donis-Keller *et al.*, *Cell* 51, 319-337 (1987); Lander *et al.*, *Genetics* 121, 185-199 (1989)). Genes localized by linkage can be cloned by a process known as directional cloning. See Wainwright, *Med. J. Australia* 159, 170-174 (1993); Collins, *Nature Genetics* 1, 3-6 (1992).

Linkage studies are typically performed on members of a family. Available members of the family are characterized for the presence or absence of a phenotypic trait and for a set of polymorphic markers. The distribution of polymorphic markers in an informative meiosis is then analyzed to determine which polymorphic markers co-segregate with a phenotypic trait. See, e.g., Kerem *et al.*, *Science* 245, 1073-1080 (1989); Monaco *et al.*, *Nature* 316, 842 (1985); Yamoka *et al.*, *Neurology* 40, 222-226 (1990); Rossiter *et al.*, *FASEB Journal* 5, 21-27 (1991).

Linkage is analyzed by calculation of LOD (log of the odds) values. A lod value is the relative likelihood of obtaining observed segregation data for a marker

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- and a genetic locus when the two are located at a recombination fraction  $\theta$ , versus the situation in which the two are not linked, and thus segregating independently (Thompson & Thompson, *Genetics in Medicine* (5th ed, W.B. Saunders Company, Philadelphia, 1991); Strachan, "Mapping the human genome" in *The Human*
- 5 *Genome* (BIOS Scientific Publishers Ltd, Oxford), Chapter 4). A series of likelihood ratios are calculated at various recombination fractions ( $\theta$ ), ranging from  $\theta = 0.0$  (coincident loci) to  $\theta = 0.50$  (unlinked). Thus, the likelihood at a given value of  $\theta$  is: probability of data if loci linked at  $\theta$  to probability of data if loci unlinked. The computed likelihoods are usually expressed as the  $\log_{10}$  of this ratio
- 10 (i.e., a lod score). For example, a lod score of 3 indicates 1000:1 odds against an apparent observed linkage being a coincidence. The use of logarithms allows data collected from different families to be combined by simple addition. Computer programs are available for the calculation of lod scores for differing values of  $\theta$  (e.g., LIPED, MLINK (Lathrop, *Proc. Nat. Acad. Sci. (USA)* 81, 3443-3446 (1984)).
- 15 For any particular lod score, a recombination fraction may be determined from mathematical tables. See Smith *et al.*, *Mathematical tables for research workers in human genetics* (Churchill, London, 1961); Smith, *Ann. Hum. Genet.* 32, 127-150 (1968). The value of  $\theta$  at which the lod score is the highest is considered to be the best estimate of the recombination fraction.
- 20 Positive lod score values suggest that the two loci are linked, whereas negative values suggest that linkage is less likely (at that value of  $\theta$ ) than the possibility that the two loci are unlinked. By convention, a combined lod score of +3 or greater (equivalent to greater than 1000:1 odds in favor of linkage) is considered definitive evidence that two loci are linked. Similarly, by convention, a negative lod score of -
- 25 2 or less is taken as definitive evidence against linkage of the two loci being compared. Negative linkage data are useful in excluding a chromosome or a segment thereof from consideration. The search focuses on the remaining non-excluded chromosomal locations.

#### IV. Modified Polypeptides and Gene Sequences

- 30 The invention further provides variant forms of nucleic acids and corresponding proteins. The nucleic acids comprise one of the sequences described

in the Table, column 5, in which the polymorphic position is occupied by one of the alternative bases for that position. Some nucleic acids encode full-length variant forms of proteins. Similarly, variant proteins have the prototypical amino acid sequences encoded by nucleic acid sequences shown in the Table, column 5, (read  
5 so as to be in-frame with the full-length coding sequence of which it is a component) except at an amino acid encoded by a codon including one of the polymorphic positions shown in the Table. That position is occupied by the amino acid coded by the corresponding codon in any of the alternative forms shown in the Table.

Variant genes can be expressed in an expression vector in which a variant gene  
10 is operably linked to a native or other promoter. Usually, the promoter is a eukaryotic promoter for expression in a mammalian cell. The transcription regulation sequences typically include a heterologous promoter and optionally an enhancer which is recognized by the host. The selection of an appropriate promoter, for example trp, lac, phage promoters, glycolytic enzyme promoters and tRNA  
15 promoters, depends on the host selected. Commercially available expression vectors can be used. Vectors can include host-recognized replication systems, amplifiable genes, selectable markers, host sequences useful for insertion into the host genome, and the like.

The means of introducing the expression construct into a host cell varies  
20 depending upon the particular construction and the target host. Suitable means include fusion, conjugation, transfection, transduction, electroporation or injection, as described in Sambrook, *supra*. A wide variety of host cells can be employed for expression of the variant gene, both prokaryotic and eukaryotic. Suitable host cells include bacteria such as *E. coli*, yeast, filamentous fungi, insect cells, mammalian  
25 cells, typically immortalized, *e.g.*, mouse, CHO, human and monkey cell lines and derivatives thereof. Preferred host cells are able to process the variant gene product to produce an appropriate mature polypeptide. Processing includes glycosylation, ubiquitination, disulfide bond formation, general post-translational modification, and the like. As used herein, "gene product" includes mRNA, peptide and protein  
30 products.

The protein may be isolated by conventional means of protein biochemistry and purification to obtain a substantially pure product, *i.e.*, 80, 95 or 99% free of cell



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component contaminants, as described in Jacoby, *Methods in Enzymology* Volume 104, Academic Press, New York (1984); Scopes, *Protein Purification, Principles and Practice*, 2nd Edition, Springer-Verlag, New York (1987); and Deutscher (ed), *Guide to Protein Purification, Methods in Enzymology*, Vol. 182 (1990). If the  
5 protein is secreted, it can be isolated from the supernatant in which the host cell is grown. If not secreted, the protein can be isolated from a lysate of the host cells.

The invention further provides transgenic nonhuman animals capable of expressing an exogenous variant gene and/or having one or both alleles of an endogenous variant gene inactivated. Expression of an exogenous variant gene is  
10 usually achieved by operably linking the gene to a promoter and optionally an enhancer, and microinjecting the construct into a zygote. See Hogan *et al.*, "Manipulating the Mouse Embryo, A Laboratory Manual," Cold Spring Harbor Laboratory. Inactivation of endogenous variant genes can be achieved by forming a transgene in which a cloned variant gene is inactivated by insertion of a positive  
15 selection marker. See Capecchi, *Science* 244, 1288-1292 (1989). The transgene is then introduced into an embryonic stem cell, where it undergoes homologous recombination with an endogenous variant gene. Mice and other rodents are preferred animals. Such animals provide useful drug screening systems.

In addition to substantially full-length polypeptides expressed by variant  
20 genes, the present invention includes biologically active fragments of the polypeptides, or analogs thereof, including organic molecules which simulate the interactions of the peptides. Biologically active fragments include any portion of the full-length polypeptide which confers a biological function on the variant gene product, including ligand binding, and antibody binding. Ligand binding includes  
25 binding by nucleic acids, proteins or polypeptides, small biologically active molecules, or large cellular structures.

Polyclonal and/or monoclonal antibodies that specifically bind to variant gene products but not to corresponding prototypical gene products are also provided. Antibodies can be made by injecting mice or other animals with the variant gene  
30 product or synthetic peptide fragments thereof. Monoclonal antibodies are screened as are described, for example, in Harlow & Lane, *Antibodies, A Laboratory Manual*, Cold Spring Harbor Press, New York (1988); Goding, *Monoclonal antibodies*,

*Principles and Practice* (2d ed.) Academic Press, New York (1986). Monoclonal antibodies are tested for specific immunoreactivity with a variant gene product and lack of immunoreactivity to the corresponding prototypical gene product. These antibodies are useful in diagnostic assays for detection of the variant form, or as an  
5 active ingredient in a pharmaceutical composition.

#### V. Kits

The invention further provides kits comprising at least one allele-specific oligonucleotide as described herein. Often, the kits contain one or more pairs of allele-specific oligonucleotides hybridizing to different forms of a polymorphism.  
10 In some kits, the allele-specific oligonucleotides are provided immobilized to a substrate. For example, the same substrate can comprise allele-specific oligonucleotide probes for detecting at least 10, 100 or all of the polymorphisms shown in the Table. Optional additional components of the kit include, for example, restriction enzymes, reverse-transcriptase or polymerase, the substrate  
15 nucleoside triphosphates, means used to label (for example, an avidin-enzyme conjugate and enzyme substrate and chromogen if the label is biotin), and the appropriate buffers for reverse transcription, PCR, or hybridization reactions. Usually, the kit also contains instructions for carrying out the methods.

The thrombospondins are a family of extracellular matrix (ECM)  
20 glycoproteins that modulate many cell behaviors including adhesion, migration, and proliferation. Thrombospondins (also known as thrombin sensitive proteins or TSPs) are large molecular weight glycoproteins composed of three identical disulfide-linked polypeptide chains. TSPs are stored in the alpha-granules of platelets and secreted by a variety of mesenchymal and epithelial cells (Majack *et al.*, *Cell Membrane* 3:57-77 (1987)). Platelets secrete TSPs when activated in the  
25 blood by such physiological agonists such as thrombin. TSPs have lectin properties and a broad function in the regulation of fibrinolysis and as a component of the ECM, and are one of a group of ECM proteins which have adhesive properties. TSPs bind to fibronectin and fibrinogen (Lahav *et al.*, *Eur J Biochem* 145:151-6  
30 (1984)), and these proteins are known to be involved in platelet adhesion to substratum and platelet aggregation (Leung, *J Clin Invest* 74:1764-1772 (1986)).

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Recent work has implicated TSPs in response of cells to growth factors. Submitogenic doses of PDGF induce a rapid but transitory, increase in TSP synthesis and secretion by rat aortic smooth muscle cells (Majack *et al.*, *J Biol Chem* 101:1059-70 (1985)). PDGF responsiveness to TSP synthesis in glial cells has also  
5 been shown (Asch *et al.*, *Proc Natl Acad Sci* 83:2904-8 (1986)). TSP mRNA levels rise rapidly in response to PDGF (Majack *et al.*, *J Biol Chem* 262:8821-5 (1987)). TSPs act synergistically with epidermal growth factor to increase DNA synthesis in smooth muscle cells (Majack *et al.*, *Proc Natl Acad Sci* 83:9050-4 (1986)), and monoclonal antibodies to TSPs inhibit smooth muscle cell proliferation (Majack *et al.*, *J Biol Chem* 106:415-22 (1988)). TSPs modulate local adhesions in endothelial  
10 cells, and TSPs, particularly TSP-1 primarily derived from platelet granules, are known to be an important activator of transforming growth factor beta-1 (TGFB-1) (Crawford *et al.*, *Cell* 93:1159 (1998)) and appear to be a potential link between platelet-thrombosis and development of atherosclerosis.

15 To determine pivotal genes associated with premature coronary artery disease, we analyzed DNA from 347 patients with MI or coronary revascularization before age 40 (men) or 45 (women) and 422 general population controls. Cases were drawn (one per family) from a retrospective collection of sibling pairs with premature CAD. Controls were ascertained through random-digit dialing. Both  
20 cases and controls were Caucasian. A complete database of phenotypic and laboratory variables for the affected patients afforded logistic regression to control for age, diabetes, body mass index, gender.

Thrombospondin (TSP) 4 and 1 emerged as important SNPs associated with premature CAD and MI. For CAD, 148 of 347 patients carried at least one copy of  
25 the TSP-4 variant compared with 142 of 422 control subjects; adjusted odds ratio 1.47,  $p=0.01$ . For premature MI, the association was even stronger: 91 of 187 cases vs. 142 of 422 controls had the variant; adjusted odds ratio 2.08,  $p=0.0003$ . The TSP-1 SNP was rare. Nonetheless, homozygosity for the variant allele gave an adjusted odds ratio of 9.5,  $p=.04$ .

30 Specific reference nucleotide (SEQ ID NO: 1) and amino acid (SEQ ID NO: 2) sequences for TSP-1 are shown in Figs. 1A-1D. Specific reference nucleotide (SEQ ID NO: 3) and amino acid (SEQ ID NO: 4) sequences for TSP-4 are shown in

Figs. 2A-2C. It is understood that the invention is not limited by these exemplified reference sequences, as variants of these sequences which differ at locations other than the SNP sites identified herein can also be utilized. The skilled artisan can readily determine the SNP sites in these other reference sequences which correspond to the SNP sites identified herein by aligning the sequence of interest with the reference sequences specifically disclosed herein, and programs for performing such alignments are commercially available. For example, the ALIGN program in the GCG software package can be used, utilizing a PAM120 weight residue table, a gap length penalty of 12 and a gap penalty of 4, for example.

Two SNPs have been specifically studied as described herein. The first (G334u4) is a change from A (reference nucleotide) to G (alternate or variant nucleotide) at nucleotide position 2210 of the nucleic acid sequence of TSP-1 (Figs. 1A-1D), resulting in a missense amino acid mutation from asparagine (reference) to serine (alternate) at amino acid 700. The second SNP (G355u2) is a change from G (reference) to C (alternate) at nucleotide position 1186 of the nucleic acid sequence of TSP-4 (Figs. 2A-2C), resulting in a missense amino acid alteration from alanine (reference) to proline (alternate) at amino acid 387. With respect to the G355u2 SNP, individuals with CAD carried at least one copy of the variant "C" allele more frequently than control individuals (43% as compared with 34%). With respect to the G355u2 SNP, individuals with MI carried at least one copy of the variant "C" allele more frequently than control individuals (49% as compared with 34%). With respect to the G334u4 SNP, individuals with CAD carried two copies of the variant "G" allele more frequently than control individuals (1.7% as compared with 0.2%). With respect to the G334u4 SNP, individuals with MI carried two copies of the variant "G" allele more frequently than control individuals (2% as compared with 0.2%).

As used herein, the term "polymorphism" refers to the occurrence of two or more genetically determined alternative sequences or alleles in a population. A polymorphic marker or site is the locus at which divergence occurs. Preferred markers have at least two alleles, each occurring at frequency of greater than 1%, and more preferably greater than 10% or 20% of a selected population. A

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polymorphic locus may be as small as one base pair, in which case it is referred to as a single nucleotide polymorphism (SNP).

Thus, the invention relates to a method for predicting the likelihood that an individual will have a vascular disease, or for aiding in the diagnosis of a vascular disease, or predicting the likelihood of having altered symptomology associated with a vascular disease, comprising the steps of obtaining a DNA sample from an individual to be assessed and determining the nucleotide present at one or more of nucleotide positions 2210 of the TSP-1 gene or 1186 of the TSP-4 gene. In a preferred embodiment, the nucleotides present at both of these nucleotide positions are determined. In one embodiment the TSP-1 gene has the nucleotide sequence of SEQ ID NO: 1 and the TSP-4 gene has the nucleotide sequence of SEQ ID NO: 3. The presence of one or more of a G (the variant nucleotide) at position 2210 of SEQ ID NO: 1 or a C (the variant nucleotide) at position 1186 of SEQ ID NO: 1186 indicates that the individual has a greater likelihood of having a vascular disease, or a greater likelihood of having severe symptomology associated with a vascular disease, than if that individual had the reference nucleotide at one or more of these positions. Conversely, the presence of one or more of an A (the reference nucleotide) at position 2210 of SEQ ID NO: 1 or a G (the reference nucleotide) at position 1186 of SEQ ID NO: 3 indicates that the individual has a reduced likelihood of having a vascular disease or a likelihood of having reduced symptomology associated with a vascular disease than if that individual had the variant nucleotide at one or more of these positions.

In a particular embodiment, the individual is an individual at risk for development of a vascular disease. In another embodiment the individual exhibits clinical symptomology associated with a vascular disease. In one embodiment, the individual has been clinically diagnosed as having a vascular disease. Vascular diseases include, but are not limited to, atherosclerosis, coronary heart disease, myocardial infarction (MI), stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism. In preferred embodiments, the vascular disease is CAD or MI.

The genetic material to be assessed can be obtained from any nucleated cell from the individual. For assay of genomic DNA, virtually any biological sample

(other than pure red blood cells) is suitable. For example, convenient tissue samples include whole blood, semen, saliva, tears, urine, fecal material, sweat, skin and hair. For assay of cDNA or mRNA, the tissue sample must be obtained from a tissue or organ in which the target nucleic acid is expressed.

- 5        Many of the methods described herein require amplification of DNA from target samples. This can be accomplished by e.g., PCR. *See generally PCR Technology: Principles and Applications for DNA Amplification* (ed. H.A. Erlich, Freeman Press, NY, NY, 1992); *PCR Protocols: A Guide to Methods and Applications* (eds. Innis, *et al.*, Academic Press, San Diego, CA, 1990); Mattila *et*  
10 *al.*, *Nucleic Acids Res.* 19, 4967 (1991); Eckert *et al.*, *PCR Methods and Applications* 1, 17 (1991); *PCR* (eds. McPherson *et al.*, IRL Press, Oxford); and U.S. Patent 4,683,202.

- Other suitable amplification methods include the ligase chain reaction (LCR) (see Wu and Wallace, *Genomics* 4, 560 (1989), Landegren *et al.*, *Science* 241, 1077  
15 (1988), transcription amplification (Kwoh *et al.*, *Proc. Natl. Acad. Sci. USA* 86, 1173 (1989)), and self-sustained sequence replication (Guatelli *et al.*, *Proc. Nat. Acad. Sci. USA*, 87, 1874 (1990)) and nucleic acid based sequence amplification (NASBA). The latter two amplification methods involve isothermal reactions based on isothermal transcription, which produce both single stranded RNA (ssRNA) and  
20 double stranded DNA (dsDNA) as the amplification products in a ratio of about 30 or 100 to 1, respectively.

- The nucleotide which occupies the polymorphic site of interest (e.g., nucleotide position 2210 in TSP-1 and/or nucleotide position 1186 in TSP-4) can be identified by a variety of methods, such as Southern analysis of genomic DNA;  
25 direct mutation analysis by restriction enzyme digestion; Northern analysis of RNA; denaturing high pressure liquid chromatography (DHPLC); gene isolation and sequencing; hybridization of an allele-specific oligonucleotide with amplified gene products; single base extension (SBE). In a preferred embodiment, determination of the allelic form of TSP is carried out using SBE-FRET methods as described herein,  
30 or using chip-based oligonucleotide arrays as described herein.

The invention also relates to a method for predicting the likelihood that an individual will have a vascular disease, or for aiding in the diagnosis of a vascular

disease, or predicting the likelihood of having altered symptomology associated with a vascular disease, comprising the steps of obtaining a biological sample comprising TSP-1 and/or TSP-4 protein or relevant portion thereof from an individual to be assessed and determining the amino acid present at one or more of amino acid

5 positions 700 of the TSP-1 gene product (e.g., as exemplified by SEQ ID NO: 2) or 387 of the TSP-4 gene product (e.g., as exemplified by SEQ ID NO: 4). In a preferred embodiment, the amino acids present at both of these amino acid positions are determined. As used herein, the term "relevant portion" of the TSP-1 and TSP-4 proteins is intended to encompass any portion of the protein which comprises the

10 polymorphic amino acid positions. The presence of one or more of a serine (the variant amino acid) at position 700 of SEQ ID NO: 2, or a proline (the variant amino acid) at position 387 of SEQ ID NO: 4 indicates that the individual has a greater likelihood of having a vascular disease, or a greater likelihood of having severe symptomology associated with a vascular disease, than if that individual had the

15 reference amino acid at one or more of these positions. Conversely, the presence of one or more of an asparagine (the reference amino acid) at position 700 of SEQ ID NO: 2, or an alanine (the reference amino acid) at position 387 of SEQ ID NO: 4 indicates that the individual has a reduced likelihood of having a vascular disease or a likelihood of having reduced symptomology associated with a vascular disease,

20 than if that individual had the variant amino acid at one or more of these positions.

In a particular embodiment, the individual is an individual at risk for development of a vascular disease. In another embodiment the individual exhibits clinical symptomology associated with a vascular disease. In one embodiment, the individual has been clinically diagnosed as having a vascular disease.

25 In this embodiment of the invention, the biological sample contains protein molecules from the test subject. *In vitro* techniques for detection of protein include enzyme linked immunosorbent assays (ELISAs), Western blots, immunoprecipitations and immunofluorescence. Furthermore, *in vivo* techniques for detection of protein include introducing into a subject a labeled anti-protein

30 antibody. For example, the antibody can be labeled with a radioactive marker whose presence and location in a subject can be detected by standard imaging techniques. Polyclonal and/or monoclonal antibodies that specifically bind to variant gene

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products but not to corresponding reference gene products, and vice versa, are also provided. Antibodies can be made by injecting mice or other animals with the variant gene product or synthetic peptide fragments thereof comprising the variant portion. Monoclonal antibodies are screened as are described, for example, in

5 Harlow & Lane, *Antibodies, A Laboratory Manual*, Cold Spring Harbor Press, New York (1988); Goding, *Monoclonal antibodies, Principles and Practice* (2d ed.) Academic Press, New York (1986). Monoclonal antibodies are tested for specific immunoreactivity with a variant gene product and lack of immunoreactivity to the corresponding prototypical gene product. These antibodies are useful in diagnostic

10 assays for detection of the variant form, or as an active ingredient in a pharmaceutical composition.

The polymorphisms of the invention may be associated with vascular disease in different ways. The polymorphisms may exert phenotypic effects indirectly via influence on replication, transcription, and translation. Additionally, the described

15 polymorphisms may predispose an individual to a distinct mutation that is causally related to a certain phenotype, such as susceptibility or resistance to vascular disease and related disorders. The discovery of the polymorphisms and their correlation with CAD and MI facilitates biochemical analysis of the variant and reference forms and the development of assays to characterize the variant and reference forms and to

20 screen for pharmaceutical agents that interact directly with one or another form of the protein.

Alternatively, these particular polymorphisms may belong to a group of two or more polymorphisms in the TSP gene(s) which contributes to the presence, absence or severity of vascular disease. An assessment of other polymorphisms within the

25 TSP gene(s) can be undertaken, and the separate and combined effects of these polymorphisms, as well as alternations in other, distinct genes, on the vascular disease phenotype can be assessed.

Correlation between a particular phenotype, e.g., the CAD or MI phenotype, and the presence or absence of a particular allele is performed for a population of

30 individuals who have been tested for the presence or absence of the phenotype. Correlation can be performed by standard statistical methods such as a Chi-squared test and statistically significant correlations between polymorphic form(s) and



phenotypic characteristics are noted. This correlation can be exploited in several ways. In the case of a strong correlation between a particular polymorphic form, e.g., the variant allele for TSP-1 and/or TSP-4, and a disease for which treatment is available, detection of the polymorphic form in an individual may justify immediate  
5 administration of treatment, or at least the institution of regular monitoring of the individual. Detection of a polymorphic form correlated with a disorder in a couple contemplating a family may also be valuable to the couple in their reproductive decisions. For example, the female partner might elect to undergo *in vitro* fertilization to avoid the possibility of transmitting such a polymorphism from her  
10 husband to her offspring. In the case of a weaker, but still statistically significant correlation between a polymorphic form and a particular disorder, immediate therapeutic intervention or monitoring may not be justified. Nevertheless, the individual can be motivated to begin simple life-style changes (e.g., diet modification, therapy or counseling) that can be accomplished at little cost to the  
15 individual but confer potential benefits in reducing the risk of conditions to which the individual may have increased susceptibility by virtue of the particular allele. Furthermore, identification of a polymorphic form correlated with enhanced receptiveness to one of several treatment regimes for a disorder indicates that this treatment regimen should be followed for the individual in question.

20 Furthermore, it may be possible to identify a physical linkage between a genetic locus associated with a trait of interest (e.g., CAD or MI) and polymorphic markers that are or are not associated with the trait, but are in physical proximity with the genetic locus responsible for the trait and co-segregate with it. Such analysis is useful for mapping a genetic locus associated with a phenotypic trait to a  
25 chromosomal position, and thereby cloning gene(s) responsible for the trait. See Lander *et al.*, *Proc. Natl. Acad. Sci. (USA)* 83, 7353-7357 (1986); Lander *et al.*, *Proc. Natl. Acad. Sci. (USA)* 84, 2363-2367 (1987); Donis-Keller *et al.*, *Cell* 51, 319-337 (1987); Lander *et al.*, *Genetics* 121, 185-199 (1989)). Genes localized by linkage can be cloned by a process known as directional cloning. See Wainwright,  
30 *Med. J. Australia* 159, 170-174 (1993); Collins, *Nature Genetics* 1, 3-6 (1992). Linkage studies are discussed in more detail above.

In another embodiment, the invention relates to pharmaceutical compositions comprising a reference TSP-1 and/or TSP-4 gene or gene product for use in the treatment of vascular disease, e.g., CAD and MI. As used herein, a reference TSP gene product is intended to mean gene products which are encoded by the reference  
5 allele of the TSP gene. In addition to substantially full-length polypeptides expressed by the genes, the present invention includes biologically active fragments of the polypeptides, or analogs thereof, including organic molecules which simulate the interactions of the peptides. Biologically active fragments include any portion of the full-length polypeptide which confers a biological function on the variant gene  
10 product, including ligand binding, and antibody binding. Ligand binding includes binding by nucleic acids, proteins or polypeptides, small biologically active molecules, or large cellular structures.

For instance, the polypeptide or protein, or fragment thereof, of the present invention can be formulated with a physiologically acceptable medium to prepare a  
15 pharmaceutical composition. The particular physiological medium may include, but is not limited to, water, buffered saline, polyols (e.g., glycerol, propylene glycol, liquid polyethylene glycol) and dextrose solutions. The optimum concentration of the active ingredient(s) in the chosen medium can be determined empirically, according to procedures well known to medicinal chemists, and will depend on the  
20 ultimate pharmaceutical formulation desired. Methods of introduction of exogenous peptides at the site of treatment include, but are not limited to, intradermal, intramuscular, intraperitoneal, intravenous, subcutaneous, oral and intranasal. Other suitable methods of introduction can also include rechargeable or biodegradable devices and slow release polymeric devices. The pharmaceutical compositions of  
25 this invention can also be administered as part of a combinatorial therapy with other agents and treatment regimens.

The invention further pertains to compositions, e.g., vectors, comprising a nucleotide sequence encoding reference or variant TSP-1 and/or TSP-4 gene products. For example, reference genes can be expressed in an expression vector in  
30 which a reference gene is operably linked to a native or other promoter. Usually, the promoter is a eukaryotic promoter for expression in a mammalian cell. The transcription regulation sequences typically include a heterologous promoter and

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optionally an enhancer which is recognized by the host. The selection of an appropriate promoter, for example trp, lac, phage promoters, glycolytic enzyme promoters and tRNA promoters, depends on the host selected. Commercially available expression vectors can be used. Vectors can include host-recognized  
5 replication systems, amplifiable genes, selectable markers, host sequences useful for insertion into the host genome, and the like.

The means of introducing the expression construct into a host cell varies depending upon the particular construction and the target host. Suitable means include fusion, conjugation, transfection, transduction, electroporation or injection,  
10 as described in Sambrook, *supra*. A wide variety of host cells can be employed for expression of the variant gene, both prokaryotic and eukaryotic. Suitable host cells include bacteria such as *E. coli*, yeast, filamentous fungi, insect cells, mammalian cells, typically immortalized, *e.g.*, mouse, CHO, human and monkey cell lines and derivatives thereof. Preferred host cells are able to process the variant gene product  
15 to produce an appropriate mature polypeptide. Processing includes glycosylation, ubiquitination, disulfide bond formation, general post-translational modification, and the like.

It is also contemplated that cells can be engineered to express the reference allele of the invention by gene therapy methods. For example, DNA encoding the  
20 reference TSP gene product, or an active fragment or derivative thereof, can be introduced into an expression vector, such as a viral vector, and the vector can be introduced into appropriate cells in an animal. In such a method, the cell population can be engineered to inducibly or constitutively express active reference TSP gene product. In a preferred embodiment, the vector is delivered to the bone marrow, for  
25 example as described in Corey *et al.* (*Science* 244:1275-1281 (1989)).

The invention further relates to the use of compositions (*i.e.*, agonists) which enhance or increase the activity of the reference (or variant) TSP (*e.g.*, TSP-1 or TSP-4) gene product, or a functional portion thereof, for use in the treatment of vascular disease. The invention also relates to the use of compositions (*i.e.*,  
30 antagonists) which reduce or decrease the activity of the variant (or reference) TSP (*e.g.*, TSP-1 or TSP-4) gene product, or a functional portion thereof, for use in the treatment of vascular disease.

The invention also relates to constructs which comprise a vector into which a sequence of the invention has been inserted in a sense or antisense orientation. For example, a vector comprising a nucleotide sequence which is antisense to the variant TSP-1 or TSP-4 allele may be used as an antagonist of the activity of the TSP-1 or TSP-4 variant allele. Alternatively, a vector comprising a nucleotide sequence of the TSP-1 or TSP-4 reference allele may be used therapeutically to treat vascular diseases. As used herein, the term "vector" refers to a nucleic acid molecule capable of transporting another nucleic acid to which it has been linked. One type of vector is a "plasmid", which refers to a circular double stranded DNA loop into which additional DNA segments can be ligated. Another type of vector is a viral vector, wherein additional DNA segments can be ligated into the viral genome. Certain vectors are capable of autonomous replication in a host cell into which they are introduced (*e.g.*, bacterial vectors having a bacterial origin of replication and episomal mammalian vectors). Other vectors (*e.g.*, non-episomal mammalian vectors) are integrated into the genome of a host cell upon introduction into the host cell, and thereby are replicated along with the host genome. Moreover, certain vectors, expression vectors, are capable of directing the expression of genes to which they are operably linked. In general, expression vectors of utility in recombinant DNA techniques are often in the form of plasmids (vectors). However, the invention is intended to include such other forms of expression vectors, such as viral vectors (*e.g.*, replication defective retroviruses, adenoviruses and adeno-associated viruses) that serve equivalent functions.

Preferred recombinant expression vectors of the invention comprise a nucleic acid of the invention in a form suitable for expression of the nucleic acid in a host cell. This means that the recombinant expression vectors include one or more regulatory sequences, selected on the basis of the host cells to be used for expression, which is operably linked to the nucleic acid sequence to be expressed. Within a recombinant expression vector, "operably linked" is intended to mean that the nucleotide sequence of interest is linked to the regulatory sequence(s) in a manner which allows for expression of the nucleotide sequence (*e.g.*, in an *in vitro* transcription/translation system or in a host cell when the vector is introduced into the host cell). The term "regulatory sequence" is intended to include promoters,

enhancers and other expression control elements (e.g., polyadenylation signals). Such regulatory sequences are described, for example, in Goeddel, *Gene Expression Technology: Methods in Enzymology 185*, Academic Press, San Diego, CA (1990). Regulatory sequences include those which direct constitutive expression of a  
5 nucleotide sequence in many types of host cell and those which direct expression of the nucleotide sequence only in certain host cells (e.g., tissue-specific regulatory sequences). It will be appreciated by those skilled in the art that the design of the expression vector can depend on such factors as the choice of the host cell to be transformed, the level of expression of protein desired, etc.

10 The expression vectors of the invention can be introduced into host cells to thereby produce proteins or peptides, including fusion proteins or peptides, encoded by nucleic acids as described herein. The recombinant expression vectors of the invention can be designed for expression of a polypeptide of the invention in prokaryotic or eukaryotic cells, e.g., bacterial cells such as *E. coli*, insect cells (using  
15 baculovirus expression vectors), yeast cells or mammalian cells. Suitable host cells are discussed further in Goeddel, *supra*. Alternatively, the recombinant expression vector can be transcribed and translated *in vitro*, for example using T7 promoter regulatory sequences and T7 polymerase.

Another aspect of the invention pertains to host cells into which a recombinant  
20 expression vector of the invention has been introduced. The terms "host cell" and "recombinant host cell" are used interchangeably herein. It is understood that such terms refer not only to the particular subject cell but also to the progeny or potential progeny of such a cell. Because certain modifications may occur in succeeding generations due to either mutation or environmental influences, such progeny may  
25 not, in fact, be identical to the parent cell, but are still included within the scope of the term as used herein. A host cell can be any prokaryotic or eukaryotic cell. For example, a nucleic acid of the invention can be expressed in bacterial cells (e.g., *E. coli*), insect cells, yeast or mammalian cells (such as Chinese hamster ovary cells (CHO) or COS cells). Other suitable host cells are known to those skilled in the art.

30 Vector DNA can be introduced into prokaryotic or eukaryotic cells via conventional transformation or transfection techniques. As used herein, the terms "transformation" and "transfection" are intended to refer to a variety of

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art-recognized techniques for introducing foreign nucleic acid (*e.g.*, DNA) into a host cell, including calcium phosphate or calcium chloride co-precipitation, DEAE-dextran-mediated transfection, lipofection, or electroporation. Suitable methods for transforming or transfecting host cells can be found in Sambrook, *et al.* 5 (*supra*), and other laboratory manuals.

A host cell of the invention, such as a prokaryotic or eukaryotic host cell in culture, can be used to produce (*i.e.*, express) a polypeptide of the invention. Accordingly, the invention further provides methods for producing a polypeptide using the host cells of the invention. In one embodiment, the method comprises 10 culturing the host cell of the invention (into which a recombinant expression vector encoding a polypeptide of the invention has been introduced) in a suitable medium such that the polypeptide is produced. In another embodiment, the method further comprises isolating the polypeptide from the medium or the host cell.

The host cells of the invention can also be used to produce nonhuman 15 transgenic animals. For example, in one embodiment, a host cell of the invention is a fertilized oocyte or an embryonic stem cell into which a nucleic acid of the invention has been introduced. Such host cells can then be used to create non-human transgenic animals in which exogenous nucleotide sequences have been introduced into their genome or homologous recombinant animals in which 20 endogenous nucleotide sequences have been altered. Such animals are useful for studying the function and/or activity of the nucleotide sequence and polypeptide encoded by the sequence and for identifying and/or evaluating modulators of their activity. As used herein, a "transgenic animal" is a non-human animal, preferably a mammal, more preferably a rodent such as a rat or mouse, in which one or more of 25 the cells of the animal includes a transgene. Other examples of transgenic animals include non-human primates, sheep, dogs, cows, goats, chickens, amphibians, etc. A transgene is exogenous DNA which is integrated into the genome of a cell from which a transgenic animal develops and which remains in the genome of the mature animal, thereby directing the expression of an encoded gene product in one or more 30 cell types or tissues of the transgenic animal. As used herein, an "homologous recombinant animal" is a non-human animal, preferably a mammal, more preferably a mouse, in which an endogenous gene has been altered by homologous

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recombination between the endogenous gene and an exogenous DNA molecule introduced into a cell of the animal, e.g., an embryonic cell of the animal, prior to development of the animal.

A transgenic animal of the invention can be created by introducing a nucleic acid of the invention into the male pronuclei of a fertilized oocyte, e.g., by microinjection, retroviral infection, and allowing the oocyte to develop in a pseudopregnant female foster animal. The sequence can be introduced as a transgene into the genome of a non-human animal. Intronic sequences and polyadenylation signals can also be included in the transgene to increase the efficiency of expression of the transgene. A tissue-specific regulatory sequence(s) can be operably linked to the transgene to direct expression of a polypeptide in particular cells. Methods for generating transgenic animals via embryo manipulation and microinjection, particularly animals such as mice, have become conventional in the art and are described, for example, in U.S. Patent Nos. 4,736,866 and 4,870,009, U.S. Patent No. 4,873,191 and in Hogan, *Manipulating the Mouse Embryo* (Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y., 1986). Similar methods are used for production of other transgenic animals. A transgenic founder animal can be identified based upon the presence of the transgene in its genome and/or expression of mRNA in tissues or cells of the animals. A transgenic founder animal can then be used to breed additional animals carrying the transgene. Moreover, transgenic animals carrying a transgene encoding the transgene can further be bred to other transgenic animals carrying other transgenes.

The invention also relates to the use of the variant and reference gene products to guide efforts to identify the causative mutation for vascular diseases or to identify or synthesize agents useful in the treatment of vascular diseases, e.g., CAD and MI. Amino acids that are essential for function can be identified by methods known in the art, such as site-directed mutagenesis or alanine-scanning mutagenesis (Cunningham *et al.*, *Science*, 244:1081-1085 (1989)). The latter procedure introduces single alanine mutations at every residue in the molecule. The resulting mutant molecules are then tested for biological activity *in vitro*, or *in vitro* activity. Sites that are critical for polypeptide activity can also be determined by structural analysis such as crystallization, nuclear magnetic resonance or photoaffinity labeling

(Smith *et al.*, *J. Mol. Biol.*, 224:899-904 (1992); de Vos *et al. Science*, 255:306-312 (1992)).

Another aspect of the invention pertains to monitoring the influence of agents (e.g., drugs, compounds) on the expression or activity of proteins of the invention in  
5 clinical trials. An exemplary method for detecting the presence or absence of proteins or nucleic acids of the invention in a biological sample involves obtaining a biological sample from a test subject and contacting the biological sample with a compound or an agent capable of detecting the protein, or nucleic acid (e.g., mRNA, genomic DNA) that encodes the protein, such that the presence of the protein or  
10 nucleic acid is detected in the biological sample. A preferred agent for detecting mRNA or genomic DNA is a labeled nucleic acid probe capable of hybridizing to mRNA or genomic DNA sequences described herein, preferably in an allele-specific manner. The nucleic acid probe can be, for example, a full-length nucleic acid, or a portion thereof, such as an oligonucleotide of at least 15, 30, 50, 100, 250 or 500  
15 nucleotides in length and sufficient to specifically hybridize under stringent conditions to appropriate mRNA or genomic DNA. Other suitable probes for use in the diagnostic assays of the invention are described herein.

The invention also encompasses kits for detecting the presence of proteins or nucleic acid molecules of the invention in a biological sample. For example, the kit  
20 can comprise a labeled compound or agent (e.g., nucleic acid probe) capable of detecting protein or mRNA in a biological sample; means for determining the amount of protein or mRNA in the sample; and means for comparing the amount of protein or mRNA in the sample with a standard. The compound or agent can be packaged in a suitable container. The kit can further comprise instructions for using  
25 the kit to detect protein or nucleic acid.

The following Examples are offered for the purpose of illustrating the present invention and are not to be construed to limit the scope of this invention. The teachings of all references cited herein are hereby incorporated herein by reference.



## EXAMPLES

## Identification of Single Nucleotide Polymorphisms

The polymorphisms shown in the Table were identified by resequencing of target sequences from individuals of diverse ethnic and geographic backgrounds by hybridization to probes immobilized to microfabricated arrays. The strategy and principles for design and use of such arrays are generally described in WO 95/11995.

A typical probe array used in this analysis has two groups of four sets of probes that respectively tile both strands of a reference sequence. A first probe set comprises a plurality of probes exhibiting perfect complementarity with one of the reference sequences. Each probe in the first probe set has an interrogation position that corresponds to a nucleotide in the reference sequence. That is, the interrogation position is aligned with the corresponding nucleotide in the reference sequence, when the probe and reference sequence are aligned to maximize complementarity between the two. For each probe in the first set, there are three corresponding probes from three additional probe sets. Thus, there are four probes corresponding to each nucleotide in the reference sequence. The probes from the three additional probe sets are identical to the corresponding probe from the first probe set except at the interrogation position, which occurs in the same position in each of the four corresponding probes from the four probe sets, and is occupied by a different nucleotide in the four probe sets. In the present analysis, probes were 25 nucleotides long. Arrays tiled for multiple different reference sequences were included on the same substrate.

Publicly available sequences for a given gene were assembled into Gap4 (<http://www.biozentrum.unibas.ch/~biocomp/staden/Overview.html>). PCR primers covering each exon were designed using Primer 3 (<http://www-genome.wi.mit.edu/cgi-bin/primer/primer3.cgi>). Primers were not designed in regions where there were sequence discrepancies between reads. Genomic DNA was amplified in at least 50 individuals using 2.5 pmol each primer, 1.5 mM MgCl<sub>2</sub>, 100 μM dNTPs, 0.75 μM AmpliTaq GOLD polymerase, and 19 ng DNA in a 15 μl reaction. Reactions were assembled using a PACKARD MultiPROBE robotic pipetting station and then put in MJ 96-well tetrad thermocyclers (96°C for 10

minutes, followed by 35 cycles of 96°C for 30 seconds, 59°C for 2 minutes, and 72°C for 2 minutes). A subset of the PCR assays for each individual were run on 3% NuSieve gels in 0.5X TBE to confirm that the reaction worked.

For a given DNA, 5 µl (about 50 ng) of each PCR or RT-PCR product were pooled (Final volume = 150-200 µl). The products were purified using QiaQuick PCR purification from Qiagen. The samples were eluted once in 35 µl sterile water and 4 µl 10X One-Phor-All buffer (Pharmacia). The pooled samples were digested with 0.2 µ DNaseI (Promega) for 10 minutes at 37°C and then labeled with 0.5 nmols biotin-N6-ddATP and 15 µ Terminal Transferase (GibcoBRL Life Technology) for 60 minutes at 37°C. Both fragmentation and labeling reactions were terminated by incubating the pooled sample for 15 minutes at 100°C.

Low-density DNA chips (Affymetrix, CA) were hybridized following the manufacturer's instructions. Briefly, the hybridization cocktail consisted of 3M TMAcI, 10 mM Tris pH 7.8, 0.01% Triton X-100, 100 mg/ml herring sperm DNA (Gibco BRL), 200 pM control biotin-labeled oligo. The processed PCR products were denatured for 7 minutes at 100°C and then added to prewarmed (37°C) hybridization solution. The chips were hybridized overnight at 44°C. Chips were washed in 1X SSPET and 6X SSPET followed by staining with 2 µg/ml SARPE and 0.5 mg/ml acetylated BSA in 200 µl of 6X SSPET for 8 minutes at room temperature. Chips were scanned using a Molecular Dynamics scanner.

Chip image files were analyzed using Ulysses (Affymetrix, CA) which uses four algorithms to identify potential polymorphisms. Candidate polymorphisms were visually inspected and assigned a confidence value: high confidence candidates displayed all three genotypes, while likely candidates showed only two genotypes (homozygous for reference sequence and heterozygous for reference and variant). Some of the candidate polymorphisms were confirmed by ABI sequencing. Identified polymorphisms were compared to several databases to determine if they were novel. Results are shown in the Table.

#### Association of Thrombospondin Gene Polymorphisms with Vascular Disease

To determine pivotal genes associated with premature coronary artery disease, we analyzed DNA from 347 patients with MI or coronary revascularization before age 40 (men) or 45 (women) and 422 general population controls. Cases were

drawn (one per family) from a retrospective collection of sibling pairs with premature CAD. Controls were ascertained through random-digit dialing. Both cases and controls were Caucasian. A complete database of phenotypic and laboratory variables for the affected patients afforded logistic regression to control  
5 for age, diabetes, body mass index, gender.

Thrombospondin (TSP) 4 and 1 emerged as important SNPs associated with premature CAD and MI. For CAD, 148 of 347 patients carried at least one copy of the TSP-4 variant compared with 142 of 422 control subjects; adjusted odds ratio 1.47,  $p=0.01$ . For premature MI, the association was even stronger: 91 of 187 cases  
10 vs. 142 of 422 controls had the variant; adjusted odds ratio 2.08,  $p=0.0003$ . The TSP-1 SNP was rare. Nonetheless, homozygosity for the variant allele gave an adjusted odds ratio of 9.5,  $p=.04$ .

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Poly ID	WIAF ID	Genbank or TIGR Accession Number	Position in Sequence	Gene Description	Flanking Seq	Mutation Type	Ref NT	Alt NT	Ref AA	Alt AA
AT3a7	WIAF-13246	U11270	11918	AT3, antithrombin III	CTGCAGGAGT[G/A]GCTGGATGAA	N	G	A	H	.
DRD5u22	WIAF-12913	M67439	310	DRD1, dopamine receptor D1	CATCTGGACC[C/T]TGCTGGGCAA	S	C	T	L	L
DRD5u23	WIAF-12914	M67439	332	DRD1, dopamine receptor D1	GTGCTGGTGT[G/C]CGCAGCCATC	M	G	C	C	S
DRD5u24	WIAF-12915	M67439	369	DRD1, dopamine receptor D1	TCCGGGCCAA[C/G]ATGACCAACG	M	C	G	N	K
DRD5u25	WIAF-12916	M67439	522	DRD1, dopamine receptor D1	TGTGCTCCAC[T/C]GCCTCCATCC	S	T	C	T	T
DRD5u26	WIAF-12917	M67439	953	DRD1, dopamine receptor D1	GCAGAGCAG[C/T]GCAGAGCTGC	M	C	T	A	V
DRD5u27	WIAF-12918	M67439	635	DRD1, dopamine receptor D1	ATGTCGGCC[T/C]GGCATGGACC	M	T	C	L	P
DRD5u28	WIAF-12919	M67439	606	DRD1, dopamine receptor D1	GCAAGATGAC[T/C]CAGCGCATGG	S	T	C	T	T
DRD5u29	WIAF-12920	M67439	845	DRD1, dopamine receptor D1	TCGCTCATCA[G/A]CTTCTACATC	M	G	A	S	N
DRD5u30	WIAF-12921	M67439	720	DRD1, dopamine receptor D1	GGGGGGGCT[G/T]GACCTGGCAA	S	G	T	L	L
DRD5u31	WIAF-12922	M67439	1044	DRD1, dopamine receptor D1	AGACCTGTC[G/A]GTGATCATGG	S	G	A	S	S
DRD5u32	WIAF-12923	M67439	766	DRD1, dopamine receptor D1	GGAGGAGGAC[T/G]TTTGGGAGCC	M	T	G	F	V

DRDSu33	WIAP-12924	M67439	777	DRD1, dopamine receptor D1	TTTGGAGGCC [C/T] GAGGTGAATG	S	C	T	P	P
DRDSu34	WIAP-12925	M67439	786	DRD1, dopamine receptor D1	CCGACGTGAA [T/G] GCAGAGAAT	M	T	G	N	K
DRDSu35	WIAP-12926	M67439	887	DRD1, dopamine receptor D1	ACCTACACGC [G/A] CATCTACCGC	M	G	A	R	H
DRDSu36	WIAP-12927	M67439	1279	DRD1, dopamine receptor D1	GTGCAGCCAC [T/G] TCTGCTCCCG	M	T	G	F	V
DRDSu37	WIAP-12928	M67439	1370	DRD1, dopamine receptor D1	GAAATCGCAG [C/T] TGCCTACATC	M	C	T	A	V
DRDSu38	WIAP-12929	M67439	1500	DRD1, dopamine receptor D1	ACCCTGTGTC [T/A] GAGTCTGTCT	S	T	A	A	A
DRDSu39	WIAP-12930	M67439	1338	DRD1, dopamine receptor D1	TCTCCTACAA [C/T] CAAGACATCG	S	C	T	N	N
DRDSu40	WIAP-12931	M67439	1215	DRD1, dopamine receptor D1	CACCAACCC [C/A] GTCATCTATG	S	C	A	P	P
DRDSu41	WIAP-12932	M67439	1242	DRD1, dopamine receptor D1	ACGCGACTT [T/C] CAGAAGGTGT	S	T	C	F	F
DRDSu42	WIAP-12933	M67439	1441	DRD1, dopamine receptor D1	CGAGGAGGAG [G/A] GTCCTTTGCA	M	G	A	C	S
DRDSu43	WIAP-12934	M67439	1460	DRD1, dopamine receptor D1	GATCGCATGT [T/C] CCAGATCTAT	M	T	C	F	S
DRDSu44	WIAP-12960	M67439	399	DRD1, dopamine receptor D1	TCTCTCTGGC [C/T] GTGCTGACC	S	C	T	A	A
DRDSu45	WIAP-12961	M67439	162	DRD1, dopamine receptor D1	TGCCGCCAGG [C/G] AGCAACGGCA	S	C	G	G	G
DRDSu46	WIAP-12962	M67439	195	DRD1, dopamine receptor D1	GGCAGTTCGG [T/G] CTATACCRGC	S	T	G	A	A
DRDSu47	WIAP-12963	M67439	264	DRD1, dopamine receptor D1	TGGGGCCCTC [A/G] CAGGTGGTCA	S	A	G	S	S
DRDSu48	WIAP-12964	M67439	465	DRD1, dopamine receptor D1	TGGCCGGTTA [C/T] TGGCCCTTTG	S	C	T	Y	Y
DRDSu49	WIAP-12965	M67439	511	DRD1, dopamine receptor D1	CTTCGACATC [A/T] TGTGCTCCAC	M	A	T	M	L
DRDSu50	WIAP-12966	M67439	557	DRD1, dopamine receptor D1	ATCAGCGTGG [A/G] CGCTACTGG	M	A	G	D	G
DRDSu51	WIAP-12967	M67439	476	DRD1, dopamine receptor D1	TGGCCCTTTG [G/A] AGCGTCTGCG	M	G	A	G	E

DRD5u52	WIAF-12968	M67439	1004	DRD1, dopamine receptor D1	AGCTGCGGG [C/T]TTCATCAAG	M	C	T	A	V
DRD5u53	WIAF-12969	M67439	1036	DRD1, dopamine receptor D1	GGTTCTCAAG [A/C]CCCTGTGCGT	M	A	C	T	P
DRD5u54	WIAF-12970	M67439	859	DRD1, dopamine receptor D1	CTACATCCCG [G/A]TTGCCATCAT	M	G	A	V	I
DRD5u55	WIAF-12971	M67439	931	DRD1, dopamine receptor D1	GATTTCTCTCC [C/T]TGGAGAGGGC	S	C	T	L	L
G10u1	WIAF-10234	J04111	1308	JUN, v-jun avian sarcoma virus 17 oncogene homolog	CCCTCAACGC [C/T]TCGTTCTCTCC	S	C	T	A	A
G10u2	WIAF-10235	J04111	1471	JUN, v-jun avian sarcoma virus 17 oncogene homolog	GCTGCTCAAG [C/T]TGGCGTCGCC	S	C	T	L	L
G10u3	WIAF-10253	J04111	2010	JUN, v-jun avian sarcoma virus 17 oncogene homolog	TGGAGTCCCA [G/A]GAGCGGATCA	S	G	A	Q	Q
G1001u1	WIAF-13746	D26135	993	DGKG, diacylglycerol kinase, gamma (90kD)	CCCCAGTGGT [G/A]TACCTGAAGG	S	G	A	V	V
G1001u2	WIAF-13764	D26135	2313	DGKG, diacylglycerol kinase, gamma (90kD)	ATGTGATGAG [A/T]GAGAAACATC	M	A	T	R	S
G1002u1	WIAF-13918	X57206	334	ITPKB, inositol 1,4,5-trisphosphate 3-kinase B	CCCCAAGATC [A/C]CGACNAGCCT	M	A	C	Q	P
G1002u2	WIAF-13925	X57206	575	ITPKB, inositol 1,4,5-trisphosphate 3-kinase B	CCAACTCAGC [T/C]TTCCTGCATA	S	T	C	A	A
G1004u1	WIAF-13567	L36151	1854	PIK4CA, phosphatidylinositol 4-kinase, catalytic, alpha polypeptide	GCCGCTCAGA [C/T]TCCGAGGATG	S	C	T	D	D
G1006u1	WIAF-12375	HT2690	858	PRKCA, protein kinase C, alpha	GGTACAAGTT [G/A]CTTAACCAAG	S	G	A	L	L
G1008u1	WIAF-12397	HT2136	300	PRKCZ, protein kinase C, zeta	CTGGCCTGCC [A/G]TGTCGGGAG	S	A	G	P	P
G1008u2	WIAF-12398	HT2136	246	PRKCZ, protein kinase C, zeta	AGTGCAGGGA [T/C]GAAGGCCCTCA	S	T	C	D	D
G1008u3	WIAF-12399	HT2136	504	PRKCZ, protein kinase C, zeta	GCTGCCACGG [C/T]CTCGTCCGCG	S	C	T	G	G
G1008u4	WIAF-12403	HT2136	807	PRKCZ, protein kinase C, zeta	AGAGAATGA [C/T]CAAATTTACG	S	C	T	D	D
G1008u5	WIAF-12404	HT2136	1514	PRKCZ, protein kinase C, zeta	GGATTTTCTG [A/T]CATCAAGTCC	M	A	T	D	V

G1008u6	WIAF-12412	HT2136	166	PRKCZ, protein kinase C, zeta	CAAGTGGGTG[G/A]ACAGCGAAGG	M	G	A	D	N
G1008u7	WIAF-12418	HT2136	560	PRKCZ, protein kinase C, zeta	TCCCAAGAGC[C/T]TCCAGTAGAC	M	C	T	P	L
G1009u1	WIAF-12396	L05186	2495	PTK2, PTK2 protein tyrosine kinase 2	TCATCAACAA[G/A]ATGAACTGG	S	G	A	K	K
G1011u1	WIAF-11988	X07876	1250	WNT2, wingless-type MMTV integration site family member 2	TCCCATGTCA[C/A]CCGATGACC	M	C	A	T	N
G1011u2	WIAF-11997	X07876	788	WNT2, wingless-type MMTV integration site family member 2	GACTATGGGA[T/C]CAAAATTGCC	M	T	C	I	T
G1011u3	WIAF-12014	X07876	1338	WNT2, wingless-type MMTV integration site family member 2	TGCACACATG[C/A]AAGGCCCCCA	N	C	A	C	*
G1011u4	WIAF-13475	X07876	856	WNT2, wingless-type MMTV integration site family member 2	CCTGATGAAT[C/T]TTCACAACAA	M	C	T	L	P
G1011u5	WIAF-13476	X07876	958	WNT2, wingless-type MMTV integration site family member 2	GACATGCTGG[C/T]TGGCCATGGC	S	C	T	L	L
G1011u6	WIAF-13477	X07876	789	WNT2, wingless-type MMTV integration site family member 2	ACTATGGGAT[C/T]AAATTTGCC	S	C	T	I	I
G1011u7	WIAF-13478	X07876	823	WNT2, wingless-type MMTV integration site family member 2	TGCAAGGAA[A/G]GGAAAGGAAA	M	A	G	R	G
G1012u1	WIAF-13408	HT48910	1574	WNT2B, wingless-type MMTV integration site family, member 2B	ATACCTTGCA[A/G]GCCCCCAAGA	S	A	G	K	K
G1016a1	WIAF-12125	Z22534	793	ACVR1, activin A receptor, type I	GGCAAGGGGA[A/G]AATGTTGCCG	S	A	G	E	B
G1016u2	WIAF-12392	Z22534	373	ACVR1, activin A receptor, type I	CTGCCCAAGC[T/C]GTGGAGTGCT	S	T	C	A	A
G1018u1	WIAF-12413	X74210	1150	ADCY2, adenylate cyclase 2 (brain)	CAAAATTGCGA[G/T]TGGGTATTAA	M	G	T	V	L
G1019u1	WIAF-12394	U83867	5475	SPTAN1, spectrin, alpha, non-erythrocytic 1 (alpha-fodrin)	GGGACCTAAC[T/C]GGCGTGCGAGA	S	T	C	T	T

G1019u2	WIAF-12406	U83867		1223	SPTAN1, spectrin, alpha, non-erythrocytic 1 (alpha-fodrin)	GCCCTCATCA [A/G] TGCAGATGAG	M	A	G	N	S
G1019u3	WIAF-12409	U83867		3555	SPTAN1, spectrin, alpha, non-erythrocytic 1 (alpha-fodrin)	CTGAAGGTCT [T/C] ATGGCAGAGG	S	T	C	L	L
G1019u4	WIAF-12415	U83867		3369	SPTAN1, spectrin, alpha, non-erythrocytic 1 (alpha-fodrin)	TCCGTGAAGC [G/A] AATGAACCTAC	S	G	A	A	A
G1019u5	WIAF-12417	U83867		5839	SPTAN1, spectrin, alpha, non-erythrocytic 1 (alpha-fodrin)	TGAGACAGAC [T/A] TCACCGTCCA	M	T	A	P	I
G1022u1	WIAF-12393	U45945		631	ATP1B2, ATPase, Na+/K+ transporting, beta 2 polypeptide	CATGAATGTT [A/G] CCTGTGCTGG	M	A	G	T	A
G1022u2	WIAF-12400	U45945		432	ATP1B2, ATPase, Na+/K+ transporting, beta 2 polypeptide	GCCGCCCTGG [G/A] CGCTATTACG	S	G	A	G	G
G1023u1	WIAF-12401	D89722		395	ARNTL, aryl hydrocarbon receptor nuclear translocator-like	AACATTAAAG [G/C] GTGCCACCAG	M	G	C	G	R
G1023u2	WIAF-12407	D89722		681	ARNTL, aryl hydrocarbon receptor nuclear translocator-like	CTCATAGATG [C/T] AAAAATCTGA	M	C	T	A	V
G1024u1	WIAF-12410	U85946		731	Homo sapiens brain secretory protein hSec10p (HSEC10) mRNA, complete cds.	GATGATTTT [C/T] AGAAGTTAAA	M	C	T	S	L
G1027u1	WIAF-12402	L47647		1135	CKB, creatine kinase, brain	TCGAGATGGA [A/G] CAGCGGCTGG	S	A	G	E	B
G1027u2	WIAF-12405	L47647		499	CKB, creatine kinase, brain	GGGAGCGCGG [A/C] GCCATCGAGA	S	A	C	R	R
G103u1	WIAF-10427	HT2269		335	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	GGGATCGCCA [T/C] GGGAACTCNA	S	T	C	H	H



G103u2	WIAF-10429	HT2269	1221	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	CCCTCCTTCT [C/T] CAAGAATTCT	M	C	T	P	S
G103u3	WIAF-10431	HT2269	1783	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	TCTCCAATT [G/C] TACAATTCT	M	G	C	C	S
G103u4	WIAF-10432	HT2269	2077	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	ACTGAATCTG [C/A] AGGCCAGGAT	M	C	A	A	E
G103u5	WIAF-10446	HT2269	3338	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	AATTGAGCT [A/T] CTTGATAAGG	S	A	T	L	L
G103u6	WIAF-10447	HT2269	3487	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	TCAGATCAT [C/T] TGATGATCT	M	C	T	S	F

G103u7	WIAP-10448	HT2269	3507	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	TTCAGTGAA [C/G] ATGCTGAAAG	M	C	G	H	D
G103u8	WIAP-10457	HT2269	1388	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	CTCTTGACGA [T/G] GACGAAGATG	M	T	G	D	E
G103u9	WIAP-10458	HT2269	1362	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	CCGGACTCTT [T/C] CAGCCATTAA	M	T	C	S	P
G103u10	WIAP-10459	HT2269	2357	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	CTGAGAAAGA [T/C] GCGGAAGATT	S	T	C	D	D
G103u11	WIAP-10462	HT2269	3109	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	TGGAAACAGAA [C/T] GAAGACAGAT	M	C	T	T	M

G103u12	WIAF-10463	HT2269	3138	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	GTTCTCTGTA [T/C] TAAAGCAACT	S	T	C	L	L
G103u14	WIAF-10484	HT2269	3553	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	AGAACAGCTG [C/T] GAAAGAGCCA	M	C	T	A	V
G103u15	WIAF-10485	HT2269	1429	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	GATGTGCAGA [C/T] GGGAGGGCCA	M	C	T	T	M
G103a16	WIAF-12097	HT2269	3335	ERCC5, excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	AAGAATTGGA [G/T] CTACTTGATA	M	G	T	E	D
G1030u1	WIAF-12411	U07358	203	ZPK, zipper (leucine) protein kinase	ACACTTCTGA [C/T] TGCACCTCCG	S	C	T	D	D
G1030u2	WIAF-12416	U07358	1806	ZPK, zipper (leucine) protein kinase	GCCACCCCAT [G/T] AACCTGGAGG	N	G	T	E	*
G1031a1	WIAF-12124	U87460	2825	GPR37, G protein-coupled receptor 37 (endothelin receptor type B-like)	GAGTACCAC [C/T] TTCACCTTAT	S	C	T	T	T
G1032u1	WIAF-12381	U57911	926	CL10RF8, chromosome 11 open reading frame 8	ACGTACATCA [A/C] TGCCTCGACG	M	A	C	N	T

G1033u1	WIAP-12437	M65188		GJA1, gap junction protein, alpha 431 L, 43kD (connexin 43)	TCTGTACCCA [C/T] ACTCTGTAC	M	C	T	T	I
G1033u2	WIAP-12438	M65188		GJA1, gap junction protein, alpha 169 L, 43kD (connexin 43)	AGGCAACATG [G/C] GTGACTGGAG	M	G	C	G	R
G1033u3	WIAP-12439	M65188		GJA1, gap junction protein, alpha 467 L, 43kD (connexin 43)	TATGTGATGC [G/A] AAAGGAAGAG	M	G	A	R	Q
G1033u4	WIAP-12440	M65188		GJA1, gap junction protein, alpha 263 L, 43kD (connexin 43)	TTCATTTTCC [G/A] AATCCTGCTG	M	G	A	R	Q
G1033u5	WIAP-12441	M65188		GJA1, gap junction protein, alpha 218 L, 43kD (connexin 43)	CAAGCCTACT [C/T] AACTGCTGGA	M	C	T	S	L
G1033u6	WIAP-12442	M65188		GJA1, gap junction protein, alpha 498 L, 43kD (connexin 43)	AGAAAGAGGA [A/G] GNACTCAAGG	S	A	G	E	E
G1033u7	WIAP-12465	M65188		GJA1, gap junction protein, alpha 550 L, 43kD (connexin 43)	GCACCTGAAG [C/A] AGATTGAGAT	M	C	A	Q	K
G1033u8	WIAP-12466	M65188		GJA1, gap junction protein, alpha 548 L, 43kD (connexin 43)	ATGCACCTGA [A/G] GCAGATTGAG	M	A	G	K	R
G1033u9	WIAP-12486	M65188		GJA1, gap junction protein, alpha 933 L, 43kD (connexin 43)	CGCTGAGCCC [T/C] GCCAAGACT	S	T	C	P	P
G1033u10	WIAP-12487	M65188		GJA1, gap junction protein, alpha 990 L, 43kD (connexin 43)	CCTCACCAC [C/T] GCTCCCTCT	S	C	T	T	T
G1033u11	WIAP-12488	M65188		GJA1, gap junction protein, alpha 1034 L, 43kD (connexin 43)	AAGCTGGTTA [C/A] TGGCGACAGA	M	C	A	T	N
G1033u12	WIAP-12489	M65188		GJA1, gap junction protein, alpha 1158 L, 43kD (connexin 43)	CTAACTCCCA [T/C] GCACAGCCTT	S	T	C	H	H
G1033u13	WIAP-12490	M65188		GJA1, gap junction protein, alpha 1222 L, 43kD (connexin 43)	TGGACATGAA [T/C] TACAGCCACT	S	T	C	L	L

G1033u14	WIAP-12491	M65188		1069	GJAL, gap junction protein, alpha 1, 43kD (connexin 43)	CCGCAATTAC [A/G] ACAAGCAAGC	M	A	G	N	D
G1033u15	WIAP-12492	M65188		1250	GJAL, gap junction protein, alpha 1, 43kD (connexin 43)	GTGACCAGC [G/A] ACCTTCAAGC	M	G	A	R	Q
G1033u16	WIAP-12496	M65188		423	GJAL, gap junction protein, alpha 1, 43kD (connexin 43)	TATTGTGTC [T/C] GTACCCACAC	S	T	C	S	S
G1033u17	WIAP-12503	M65188		880	GJAL, gap junction protein, alpha 1, 43kD (connexin 43)	CGTTAAGGAT [C/T] GGGTTAAGGG	M	C	T	R	W
G1033u18	WIAP-12504	M65188		855	GJAL, gap junction protein, alpha 1, 43kD (connexin 43)	AACCTTCTTA [T/C] GTTTTCTTCA	S	T	C	Y	Y
G1033u19	WIAP-12505	M65188		576	GJAL, gap junction protein, alpha 1, 43kD (connexin 43)	AGTTCAAGTA [C/T] GGTATTGAAG	S	C	T	Y	Y
G1033u20	WIAP-12512	M65188		1255	GJAL, gap junction protein, alpha 1, 43kD (connexin 43)	CCAGCGACT [T/G] CAAGCAGAGC	M	T	G	S	A
G1033u21	WIAP-12513	M65188		1078	GJAL, gap junction protein, alpha 1, 43kD (connexin 43)	CAACAAGCAA [G/A] CAAGTGAGCA	M	G	A	A	T
G1033u22	WIAP-12514	M65188		1097	GJAL, gap junction protein, alpha 1, 43kD (connexin 43)	CAAAACTGGG [C/G] TAATTACAGT	M	C	G	A	G
G1034u1	WIAP-12443	J03544		1201	PYGB, phosphorylase, glycogen; brain	AGACCTGTGC [A/G] TACACCAACC	S	A	G	A	A
G1034u2	WIAP-12469	J03544		771	PYGB, phosphorylase, glycogen; brain	GACACCCAG [T/C] GCCCGGCTAC	M	T	C	V	A
G1034u3	WIAP-12470	J03544		1465	PYGB, phosphorylase, glycogen; brain	TCCACTCGGA [G/C] ATCGTGAAC	M	G	C	E	D
G1034u4	WIAP-12471	J03544		1583	PYGB, phosphorylase, glycogen; brain	GGGGCTGGCC [G/A] ATACCATCGT	M	G	A	D	N
G1034u5	WIAP-12472	J03544		1774	PYGB, phosphorylase, glycogen; brain	CCATGTTCTGA [T/C] GTGCATGTGA	S	T	C	D	D
G1034u6	WIAP-12474	J03544		2449	PYGB, phosphorylase, glycogen; brain	AGGTGGACCA [G/A] CTGTACCGGA	S	G	A	Q	Q

G1034u7	WIAF-12508	J03544	718 brain	PYGB, phosphorylase, glycogen;	CCCCGACGG [C/T] GTGAAGTGGC	S	C	T	G	G
G1035u1	WIAF-12484	U97105	1962 2	DPYSL2, dihydropyrimidinase-like	GCAGAGAGC [A/G] GCAGAGATC	M	A	G	Q	R
G1035u2	WIAF-12485	U97105	2842 2	DPYSL2, dihydropyrimidinase-like	ATGACGACC [T/C] GTGTGTGAAG	S	T	C	P	P
G1035u3	WIAF-12511	U97105	2062 2	DPYSL2, dihydropyrimidinase-like	CCATCACCAT [C/T] GCCAACACAGA	S	C	T	I	I
G1036u1	WIAF-12444	D88460	311 like	WASL, Wiskott-Aldrich syndrome-	ACGTGGGGTC [C/T] CTGTTGCTCA	S	C	T	S	S
G1038u1	WIAF-12445	HT2746	994	PCTK2, PCTAIRE protein kinase 2	TACAGAGAAAG [G/A] TATTGCATCG	M	G	A	V	I
G1039u1	WIAF-12429	HT2747	955	serine/threonine kinase, PCTAIRE-3	ATCCAAGAGT [C/T] GCATGTCAGC	M	C	T	R	C
G1039u2	WIAF-12458	HT2747	808	serine/threonine kinase, PCTAIRE-3	CACAGAAGAG [A/T] CGTGGCCCGG	M	A	T	T	S
G1041u1	WIAF-12459	X72886	544	H.sapiens TYRO3 mRNA.	CAAGTGGCTG [G/C] CCTGGAGAG	M	G	C	A	P
G1041u2	WIAF-12460	X72886	693	H.sapiens TYRO3 mRNA.	TTGGCGGGAA [C/T] CGCCTGAAAC	S	C	T	N	N
G1041u3	WIAF-12502	X72886	561	H.sapiens TYRO3 mRNA.	AGAGCCTGGC [C/T] GACAACTGT	S	C	T	A	A
G1043u1	WIAF-12448	M94055	5481	Human voltage-gated sodium channel mRNA, complete cds.	CTCTGAGTGA [G/A] GATGACTTTG	S	G	A	E	E
G1043u2	WIAF-12449	M94055	5205	Human voltage-gated sodium channel mRNA, complete cds.	TTGAGACCTT [T/C] GGCAACAGCA	S	T	C	F	F
G1043u3	WIAF-12450	M94055	5224	Human voltage-gated sodium channel mRNA, complete cds.	CATGATCTGC [C/T] TGTTCCAAT	S	C	T	L	L
G1043u4	WIAF-12451	M94055	5514	Human voltage-gated sodium channel mRNA, complete cds.	AGGTTTGGGA [G/A] AAGTTTGATC	S	G	A	E	E
G1043u5	WIAF-12452	M94055	5217	Human voltage-gated sodium channel mRNA, complete cds.	GCAACAGCAT [G/C] ATCTGCTGT	M	G	C	M	I
G1043u6	WIAF-12453	M94055	5334	Human voltage-gated sodium channel mRNA, complete cds.	GCTCAGTTAA [A/G] GGAGACTGTG	S	A	G	K	K

G1043u7	WIAP-12454	M94055		Human voltage-gated sodium channel mRNA, complete cds.	5424	TGTACATCGC[G/C]GTCATCCTGG	S	G	C	A	A	A
G1043u8	WIAP-12455	M94055		Human voltage-gated sodium channel mRNA, complete cds.	5322	ATCACCTGG[A/C]AGCTCAGTTA	S	A	C	G	G	G
G1043u9	WIAP-12456	M94055		Human voltage-gated sodium channel mRNA, complete cds.	1200	ATGGCTACAC[G/A]AGCTTTGACA	S	G	A	T	T	T
G1043u10	WIAP-12459	M94055		Human voltage-gated sodium channel mRNA, complete cds.	1170	TCTGTGTGAA[G/T]GCTGGTAGAA	M	G	T	K	N	
G1046a1	WIAP-13187	U50352		ACCN1, amiloride-sensitive cation channel 1, neuronal (degenerin)	267	TCCCAGCTGT[G/A]ACCCCTCTGTA	S	G	A	V	V	
G1046a2	WIAP-13188	U50352		ACCN1, amiloride-sensitive cation channel 1, neuronal (degenerin)	282	TCTGTAACT[C/G]AATGGCTTCC	S	C	G	L	L	
G1046a3	WIAP-13189	U50352		ACCN1, amiloride-sensitive cation channel 1, neuronal (degenerin)	315	TCACCACCAC[C/T]GACCTGTACC	S	C	T	N	N	
G1046a4	WIAP-13190	U50352		ACCN1, amiloride-sensitive cation channel 1, neuronal (degenerin)	386	CCCCATCTGG[C/A]TGACCCCTCC	M	C	A	A	D	
G1046a5	WIAP-13191	U50352		ACCN1, amiloride-sensitive cation channel 1, neuronal (degenerin)	417	CCCTGGGCA[G/A]AAGGCCAACT	S	G	A	Q	Q	
G1048u1	WIAP-12641	HT5174S		REST, RE1-silencing transcription factor	3214	CAGTCAAAAGC[G/A]GCTAAGGGAG	S	G	A	A	A	
G1048u2	WIAP-12642	HT5174S		REST, RE1-silencing transcription factor	3199	CAAAGGAAGC[C/G]TTGGCAGTCA	S	C	G	A	A	
G1048u3	WIAP-12657	HT5174S		REST, RE1-silencing transcription factor	2125	CTCCCATGGA[G/T]ACTGCTCAGA	M	G	T	E	D	
G1048u4	WIAP-12660	HT5174S		REST, RE1-silencing transcription factor	2333	GGAACTGTT[A/C]AGATAGAGCT	M	A	C	K	Q	
G1051u1	WIAP-12431	HT28321		SCNN1G, sodium channel, nonvoltage-gated 1, gamma	658	ATGACACCTC[C/T]GACTGTGCCA	S	C	T	S	S	
G1051u2	WIAP-12434	HT28321		SCNN1G, sodium channel, nonvoltage-gated 1, gamma	1735	AAGCCNAGGA[G/A]TGGTGGGCCT	S	G	A	E	E	

G1051u3	WIAF-12473	HT28321	409	SCNN1G, sodium channel, nonvoltage-gated 1, gamma	AGTCCCTGTA [T/C]GGCTTTCCAG	S	T	C	Y	Y
G1051u4	WIAF-12475	HT28321	953	SCNN1G, sodium channel, nonvoltage-gated 1, gamma	AGTCATTTTG [T/C]ACATAAACGA	M	T	C	Y	H
G1051u5	WIAF-12476	HT28321	975	SCNN1G, sodium channel, nonvoltage-gated 1, gamma	GAGGAATACA [A/G]CCCATTTCTC	M	A	G	N	S
G1051u6	WIAF-12477	HT28321	1192	SCNN1G, sodium channel, nonvoltage-gated 1, gamma	CTGCCTACTC [G/A]CTCCAGATCT	S	G	A	S	S
G1053a1	WIAF-13192	HT2201	4085	SCN5A, sodium channel, voltage-gated, type V, alpha polypeptide (long (electrocardiographic) QT syndrome 3)	CGTCCTCTGA [G/A]AGCTCTGTCA	M	G	A	R	K
G1053a2	WIAF-13193	HT2201	5607	SCN5A, sodium channel, voltage-gated, type V, alpha polypeptide (long (electrocardiographic) QT syndrome 3)	ACTTTGCCGA [C/T]GCCCTGTCTG	S	C	T	D	D
G1053a3	WIAF-13194	HT2201	5828	SCN5A, sodium channel, voltage-gated, type V, alpha polypeptide (long (electrocardiographic) QT syndrome 3)	GAGCCCATCA [C/T]CACCACACTC	M	C	T	T	I
G1053a4	WIAF-13202	HT2201	713	SCN5A, sodium channel, voltage-gated, type V, alpha polypeptide (long (electrocardiographic) QT syndrome 3)	GCGTTCACTT [T/A]CCTTCGGGAC	M	T	A	F	Y
G1053a5	WIAF-13203	HT2201	6148	SCN5A, sodium channel, voltage-gated, type V, alpha polypeptide (long (electrocardiographic) QT syndrome 3)	CCACAGTGAA [G/T]ATCTGCCGA	M	G	T	D	Y
G1053a6	WIAF-13204	HT2201	6217	SCN5A, sodium channel, voltage-gated, type V, alpha polypeptide (long (electrocardiographic) QT syndrome 3)	GGCCTGGCTG [G/T]CCAGGACACA	-	G	T	-	-



G1053a7	WIAF-13205	HT2201	6324	SCN5A, sodium channel, voltage-gated, type V, alpha polypeptide (long (electrocardiographic) QT syndrome 3)	AATGGGCCTC [G/A] GCCCGCGGA	-	G	A	-	-
G1054u1	WIAF-12419	HT2202	2252	SCN4A, sodium channel, voltage-gated, type IV, alpha polypeptide	TTGCCNAGAG [C/T] TACAAGGAGT	S	C	T	S	S
G1054u2	WIAF-12423	HT2202	4559	SCN4A, sodium channel, voltage-gated, type IV, alpha polypeptide	TGGTCATGTT [C/T] ATCTACTCCA	S	C	T	F	F
G1054u3	WIAF-12424	HT2202	4856	SCN4A, sodium channel, voltage-gated, type IV, alpha polypeptide	TCAACATGTA [C/G] ATCGCCATCA	N	C	G	Y	*
G1054u4	WIAF-12425	HT2202	4777	SCN4A, sodium channel, voltage-gated, type IV, alpha polypeptide	GTCAGGGGTG [A/G] CTGCGGCAAC	M	A	G	D	G
G1054u5	WIAF-12426	HT2202	4863	SCN4A, sodium channel, voltage-gated, type IV, alpha polypeptide	GTACATGCC [A/G] TCATCCTGGA	M	A	G	I	V
G1054u6	WIAF-12427	HT2202	4566	SCN4A, sodium channel, voltage-gated, type IV, alpha polypeptide	GTTTCATCTAC [T/G] CCATCTTCGG	M	T	G	S	A
G1054u7	WIAF-12428	HT2202	4923	SCN4A, sodium channel, voltage-gated, type IV, alpha polypeptide	TGGTCAAGAT [G/T] ACTTTGAGAT	M	G	T	D	Y
G1054u8	WIAF-12446	HT2202	3595	SCN4A, sodium channel, voltage-gated, type IV, alpha polypeptide	TTCTGGCTGA [T/C] CTTCAGCATC	M	T	C	I	T
G1054u9	WIAF-12447	HT2202	4203	SCN4A, sodium channel, voltage-gated, type IV, alpha polypeptide	GGAGACAGAC [G/A] ACCAGAGCCA	M	G	A	D	N
G1054u10	WIAF-12495	HT2202	4811	SCN4A, sodium channel, voltage-gated, type IV, alpha polypeptide	TCTGCTTCTT [C/A] TGCAGCTATA	M	C	A	F	L
G1054u11	WIAF-12497	HT2202	5555	SCN4A, sodium channel, voltage-gated, type IV, alpha polypeptide	CAGGCGAGAC [T/G] GTGCGCCAG	S	T	G	T	T

G1054u12	WIAF-12498	HT2202		5480	SCN4A, sodium channel, voltage-gated, type IV, alpha polypeptide	CAGGGGACGC [C/T] GGACCACTA	S	C	T	A	A
G1059u1	WIAF-12432	HT33704		112	APLP1, amyloid beta (A4) precursor-like protein 1	CGCTGTGCT [G/A] CCACTATTGC	S	G	A	L	L
G1059u2	WIAF-12433	HT33704		140	APLP1, amyloid beta (A4) precursor-like protein 1	TCGTGGGGCG [C/T] AGCCCGCCAT	N	C	T	Q	*
G1059u3	WIAF-12435	HT33704		1344	APLP1, amyloid beta (A4) precursor-like protein 1	CACATGTGG [C/T] CGCCGTGGAT	M	C	T	A	V
G1059u4	WIAF-12457	HT33704		1687	APLP1, amyloid beta (A4) precursor-like protein 1	ATGAGCGAAA [G/A] GTGATGCGT	S	G	A	K	K
G1059u5	WIAF-12500	HT33704		976	APLP1, amyloid beta (A4) precursor-like protein 1	GGTTCCTGAG [A/G] GCCAAGATGG	S	A	G	R	R
G1059u6	WIAF-12501	HT33704		1786	APLP1, amyloid beta (A4) precursor-like protein 1	GTGAGGCTGT [A/G] TCGGGTCTGC	S	A	G	V	V
G1060u1	WIAF-12436	HT1418		1744	APLP2, amyloid beta (A4) precursor-like protein 2	CCAAGAAATT [C/G] AAGAGGAAAT	M	C	G	Q	E
G1060u2	WIAF-12467	HT1418		2213	APLP2, amyloid beta (A4) precursor-like protein 2	ATCAGCCTGG [T/G] GATGCTGAGG	M	T	G	V	G
G1060u3	WIAF-12468	HT1418		2256	APLP2, amyloid beta (A4) precursor-like protein 2	GCCACGGGAT [C/T] GTGGAGGTTG	S	C	T	I	I
G1066a1	WIAF-13195	HT3538		566	CCKBR, cholecystokinin B receptor	CTTTGGCACC [G/A] TCATCTGCAA	M	G	A	V	I
G1066a2	WIAF-13196	HT3538		607	CCKBR, cholecystokinin B receptor	GGGTGTCTGT [G/A] AGTGTGTCCA	S	G	A	V	V
G1066a3	WIAF-13206	HT3538		864	CCKBR, cholecystokinin B receptor	CTGTGTGCTTC [T/A] GCTCTTGTTC	M	T	A	L	Q
G1067u1	WIAF-12478	HT0830		684	KCNAL, potassium voltage-gated channel, shaker-related subfamily, member 1 (episodic ataxia with myokymia)	AAACGCTGTG [C/T] ATCATCTGGT	S	C	T	C	C
G1067u2	WIAF-12479	HT0830		722	KCNAL, potassium voltage-gated channel, shaker-related subfamily, member 1 (episodic ataxia with myokymia)	GTGCGCTTCT [T/C] CGCCTGCCCC	M	T	C	F	S

G1067u3	WIAF-12480	HT0830		804	KCNA1, potassium voltage-gated channel, shaker-related subfamily, member 1 (episodic ataxia with myokymia)	ATTTCATCAC [C/G] CTGGGCACCG	S	C	G	T	T
G1067u4	WIAF-12509	HT0830		690	KCNA1, potassium voltage-gated channel, shaker-related subfamily, member 1 (episodic ataxia with myokymia)	TGTGCATCAT [C/T] TGGTTCTCCT	S	C	T	I	I
G1068u1	WIAF-12493	HT0831		774	KCNA2, potassium voltage-gated channel, shaker-related subfamily, member 2	TGAACATCAT [T/A] GACATTTGCG	S	T	A	I	I
G1070a1	WIAF-13197	HT27728		522	KCNJ6, potassium inwardly-rectifying channel, subfamily J, member 6	CACAGTGACC [T/C] GGCTCTTTT	M	T	C	M	R
G1070a2	WIAF-13201	HT27728		1244	KCNJ6, potassium inwardly-rectifying channel, subfamily J, member 6	CCCTGGAGCA [T/C] GGGTTCTACG	S	T	C	D	D
G1070a3	WIAF-13207	HT27728		707	KCNJ6, potassium inwardly-rectifying channel, subfamily J, member 6	ATAAATGCC [G/A] GAGGGAATTA	S	G	A	P	P
G1071u1	WIAF-12422	HT48672		1534	KCNJ3, potassium inwardly-rectifying channel, subfamily J, member 3	TTCCGGGCAA [C/T] TCAGAAGAA	S	C	T	N	N
G1073u1	WIAF-12461	HT4556		1127	KCNJ1, potassium inwardly-rectifying channel, subfamily J, member 1	CACTGTGCCA [T/C] GTGCCTTTAT	M	T	C	M	T
G1074u1	WIAF-12462	HT27804		289	KCNAB2, potassium voltage-gated channel, shaker-related subfamily, beta member 2	ACCTCTTCCA [T/C] ACAGCAGAAG	S	T	C	D	D
G1079u1	WIAF-12463	HT27383		1130	potassium channel, inwardly rectifying (GB:D50582)	ACCTGGCCGA [T/A] GAGATCCTGT	M	T	A	D	E
G1079u2	WIAF-12464	HT27383		1192	potassium channel, inwardly rectifying (GB:D50582)	CGTTACTCTG [T/G] GGACTACTCC	M	T	G	V	G

G1079u3	WIAF-12481	HT27383	708	potassium channel, inwardly rectifying (GB:D50582)	GCTTGGCTGC [A/G] TCTTCATGAA	M	A	G	I	V
G1079u4	WIAF-12482	HT27383	779	potassium channel, inwardly rectifying (GB:D50582)	CGGTATCGC [T/C] CTGCGCCACG	S	T	C	A	A
G1079u5	WIAF-12483	HT27383	276	potassium channel, inwardly rectifying (GB:D50582)	GGACCTGCC [G/A] AGCCACGGTA	M	G	A	E	K
G1079u6	WIAF-12510	HT27383	489	potassium channel, inwardly rectifying (GB:D50582)	GTGGCTCATC [G/A] CCTTCGCCCA	M	G	A	A	T
G1080u1	WIAF-12536	HT4412	1099	KCNJ4, potassium inwardly-rectifying channel, subfamily J, member 4	TGGACTACTC [A/G] CGTTTTCACA	S	A	G	S	S
G1080u2	WIAF-12537	HT4412	1050	KCNJ4, potassium inwardly-rectifying channel, subfamily J, member 4	GGCCACCGCT [T/A] TGAGCTGTG	M	T	A	F	Y
G1081u1	WIAF-12538	HT27724	1090	KCNJ2, potassium inwardly-rectifying channel, subfamily J, member 2	GGCCACCGCT [A/T] TGAGCTGTG	M	A	T	Y	F
G1082u1	WIAF-12662	HT28319	768	potassium channel, inwardly rectifying, high conductance, alpha subunit	CGCGGTGCAC [C/T] GAGGAGGGCG	S	C	T	T	T
G1082u2	WIAF-12663	HT28319	854	potassium channel, inwardly rectifying, high conductance, alpha subunit	CTGGTGTGCG [C/T] CATCACCATC	M	C	T	P	L
G1082u3	WIAF-12679	HT28319	471	potassium channel, inwardly rectifying, high conductance, alpha subunit	TCTCCATCGA [G/C] ACGCAGACCA	M	G	C	E	D
G1084a1	WIAF-13198	HT0383	2028	KCNB1, potassium voltage-gated channel, Shab-related subfamily, member 1	CACTCCCCAG [C/A] AAGACTGGGG	M	C	A	S	R
G1084a2	WIAF-13199	HT0383	2033	KCNB1, potassium voltage-gated channel, Shab-related subfamily, member 1	CCAGCAAGA [C/G] TGGGGGACG	M	C	G	T	S

G1084a3	WIAF-13200	HT0383		2321	KCNB1, potassium voltage-gated channel, Shab-related subfamily, member 1	GAGTGTGCCA [C/A] GCTTTTGAC	M	C	A	T	K
G1084a4	WIAF-13208	HT0383		870	KCNB1, potassium voltage-gated channel, Shab-related subfamily, member 1	ACRACCCCA [G/A] CTGGCCACG	S	G	A	Q	Q
G1088u1	WIAF-12516	HT0522		1503	KCNA5, potassium voltage-gated channel, shaker-related subfamily, member 5	TCCTGGCAA [G/A] ACCTTGACG	S	G	A	K	K
G1088u2	WIAF-12519	HT0522		1249	KCNA5, potassium voltage-gated channel, shaker-related subfamily, member 5	CGAGCTGCTC [G/A] TGGCTTCTT	M	G	A	V	M
G1088u3	WIAF-12520	HT0522		973	KCNA5, potassium voltage-gated channel, shaker-related subfamily, member 5	CTCTGGGTCC [G/A] CGGGGCCAT	M	G	A	A	T
G1088u4	WIAF-12521	HT0522		1013	KCNA5, potassium voltage-gated channel, shaker-related subfamily, member 5	GTTATCCTCA [T/C] CTCATCATC	M	T	C	I	T
G1090u1	WIAF-12651	HT1497		1836	KCNA6, potassium voltage-gated channel, shaker-related subfamily, member 6	CAACCAGCCA [G/A] TGGAGGAGC	M	G	A	S	N
G1091u1	WIAF-12714	HT0222		843	KCNA3, potassium voltage-gated channel, shaker-related subfamily, member 3	CATCATCTGG [T/C] TCTCCTTCA	M	T	C	F	L
G1094a1	WIAF-13218	HT27381		1280	KCNJ8, potassium inwardly-rectifying channel, subfamily J, member 8	GTGATTCTG [T/a] GGATTACTCC	M	T	a	V	E

G1095u1	WIAF-12532	HT2629	7651	KCNMA1, potassium large conductance calcium-activated channel, subfamily M, alpha member	TTCTCTACTT [C/T] GGCTTGGCGT	S	C	T	P	P
G1095u2	WIAF-12533	HT2629	24411	KCNMA1, potassium large conductance calcium-activated channel, subfamily M, alpha member	GTGGTCTGCA [T/C] CTTTGGCGAC	M	T	C	I	T
G1095u3	WIAF-12534	HT2629	27141	KCNMA1, potassium large conductance calcium-activated channel, subfamily M, alpha member	GATGATACTT [C/G] GCTGCAGGAC	M	C	G	S	W
G1095u4	WIAF-12535	HT2629	24391	KCNMA1, potassium large conductance calcium-activated channel, subfamily M, alpha member	TCGTGCTGTG [C/T] ATCTTTGGCG	S	C	T	C	C
G1095u5	WIAF-12539	HT2629	30481	KCNMA1, potassium large conductance calcium-activated channel, subfamily M, alpha member	CACATCATGAG [C/T] GCGACGTACT	S	C	T	S	S
G1095u6	WIAF-12544	HT2629	23521	KCNMA1, potassium large conductance calcium-activated channel, subfamily M, alpha member	GGATGTTTCA [C/T] TGTGTGCAC	S	C	T	H	H
G1095u7	WIAF-12545	HT2629	23921	KCNMA1, potassium large conductance calcium-activated channel, subfamily M, alpha member	CATCTGTACT [C/T] GAAGTGAAGC	N	C	T	R	*

G1095u8	WIAP-12546	HT2629			KCNMA1, potassium large conductance calcium-activated channel, subfamily M, alpha member 1	2295	CTGGCAATGA [T/C] CAGATTGACA	S	T	C	D	D
G1095u9	WIAP-12548	HT2629			KCNMA1, potassium large conductance calcium-activated channel, subfamily M, alpha member 1	2949	AGTTTTTGGA [C/T] CAAGACGATG	S	C	T	D	D
G1095u10	WIAP-12549	HT2629			KCNMA1, potassium large conductance calcium-activated channel, subfamily M, alpha member 1	2865	TGCACGGGAT [G/A] TTACGTCAC	M	G	A	M	I
G1096u1	WIAP-12547	L26318			PRKM8, protein kinase mitogen-activated 8 (MAP kinase)	930	TGCTGGTAAT [A/T] GATGCATCTA	S	A	T	I	I
G1098u1	WIAP-12515	L19711			DAG1, dystroglycan 1 (dystrophin-associated glycoprotein 1)	2650	TCTACTGCA [C/T] ACAGTCATTG	S	C	T	H	H
G110u1	WIAP-10385	HT27392			meiosis-specific recA homolog, HsL1m15	210	CAAAGGTATA [C/T] AGATGACAAC	N	C	T	Q	*
G110u2	WIAP-10397	HT27392			meiosis-specific recA homolog, HsL1m15	1050	CCTGAAAATG [A/G] AGCCACCTTC	M	A	G	E	G
G110u3	WIAP-10399	HT27392			meiosis-specific recA homolog, HsL1m15	674	TGAACATCAG [A/G] TGGAGCTACT	M	A	G	M	V
G1106u1	WIAP-12647	HT5073			MAP1B, microtubule-associated protein 1B	5781	ACTATGAGAA [G/A] ATAGAGAGAA	S	G	A	K	K
G1106u2	WIAP-12648	HT5073			MAP1B, microtubule-associated protein 1B	5916	CTGAAGAGGG [C/T] GGGTACTCAT	S	C	T	G	G
G1106u3	WIAP-12650	HT5073			MAP1B, microtubule-associated protein 1B	1837	AGACAGGCCA [G/A] TAAAAACAGA	M	G	A	V	I
G1106u4	WIAP-12653	HT5073			MAP1B, microtubule-associated protein 1B	2476	CACCACAGCA [G/A] CTGTCATGGC	M	G	A	A	T
G1106u5	WIAP-12656	HT5073			MAP1B, microtubule-associated protein 1B	3913	GCCCAATGAG [A/G] TTAAGTCTC	M	A	G	I	V
G1106u6	WIAP-12667	HT5073			MAP1B, microtubule-associated protein 1B	559	GATTTTCACC [G/A] ATCAAGAGAT	M	G	A	D	N

G1106u7	WIAP-12668	HT5073	570	MAP1B, microtubule-associated protein 1B	ATCAGAGAT [C/T] GGGAGTTAC	S	C	T	I	I
G1106u8	WIAP-12669	HT5073	6175	MAP1B, microtubule-associated protein 1B	TACTTCCACA [T/C] ACTGTTACGA	M	T	C	Y	H
G1106u9	WIAP-12670	HT5073	1215	MAP1B, microtubule-associated protein 1B	TCACTCTCCA [G/C] TACCTAAACA	M	G	C	Q	H
G1106u10	WIAP-12672	HT5073	1821	MAP1B, microtubule-associated protein 1B	AGGTAATGGT [G/A] AAAAAAGACA	S	G	A	V	V
G1106u11	WIAP-12673	HT5073	2727	MAP1B, microtubule-associated protein 1B	GTCTGCGGA [G/T] TCCCTGATG	M	G	T	E	D
G1106u12	WIAP-12674	HT5073	2739	MAP1B, microtubule-associated protein 1B	CCCCGTGATGA [G/A] GGAATCACTA	S	G	A	E	E
G1106u13	WIAP-12676	HT5073	3643	MAP1B, microtubule-associated protein 1B	AGATGCCACT [G/A] ATGCAAGGA	M	G	A	D	N
G1106u14	WIAP-12677	HT5073	3609	MAP1B, microtubule-associated protein 1B	CACCGCTCAA [C/T] GGATTTTCTG	S	C	T	N	N
G1106u15	WIAP-12682	HT5073	4752	MAP1B, microtubule-associated protein 1B	TTCAGAGCC [A/T] ACAACAGATG	S	A	T	P	P
G1110u1	WIAP-12517	HT1096	1527	myelin associated glycoprotein	GCGGCTCGT [G/C] CTCACGACA	S	G	C	V	V
G1110u2	WIAP-12518	HT1096	1678	myelin associated glycoprotein	TGTGGGCGCC [G/T] TGGTCGCTT	M	G	T	V	L
G1110u3	WIAP-12522	HT1096	1271	myelin associated glycoprotein	GCCGTGTCAC [C/T] CGAGGATGAT	M	C	T	P	L
G1113u1	WIAP-12523	HT2242	353	myelin transcription factor 1	AATCCGATC [G/T] GATCCTCAGG	M	G	T	R	L
G1116a1	WIAP-13217	HT28451	417	myelin oligodendrocyte glycoprotein (MOG)	CAAGCTTATC [G/A] AGACCCCTCTC	S	G	A	S	S
G1116a2	WIAP-13219	HT28451	913	myelin oligodendrocyte glycoprotein (MOG)	GCAGATCACT [C/G] TTGGCCTCGT	M	C	G	L	V
G1116a3	WIAP-13220	HT28451	922	myelin oligodendrocyte glycoprotein (MOG)	TCTTGGCCTC [G/A] TCTTCCTCTG	M	G	A	V	I
G1120u1	WIAP-12525	HT3695	1200	neurofilament, subunit H	TAGAGATAGC [T/C] GCTTACAGAA	S	T	C	A	A
G1123u1	WIAP-12542	HT2569	2269	OMG, oligodendrocyte myelin glycoprotein	CAGCTGCAAC [T/C] CTAACATTTC	S	T	C	T	T
G1126u1	WIAP-12526	HT28354	626	PSEN2, presenilin 2 (Alzheimer disease 4)	GAGCGAAGCA [T/C] GTGATCATGC	S	T	C	H	H
G1126u2	WIAP-12527	HT28354	494	PSEN2, presenilin 2 (Alzheimer disease 4)	ATGGAGAGAA [T/C] ACTGCCCACT	S	T	C	N	N



G1126u3	WIAF-12528	HT28354	434	PSEN2, presenilin 2 (Alzheimer disease 4)	TAATGTGGC[C/T]GAGAGCCCA	S	C	T	A	A
G1126u4	WIAF-12543	HT28354	550	PSEN2, presenilin 2 (Alzheimer disease 4)	GACCTGACC[G/A]CTATGCTGT	M	G	A	R	H
G117u1	WIAF-10391	HT27765	156	GTBP, G/T mismatch-binding protein	ACTTCTCACC[A/G]GGAGATTGG	S	A	G	P	P
G117u2	WIAF-10392	HT27765	420	GTBP, G/T mismatch-binding protein	AACGTGAGA[T/C]GAAGCCTTA	S	T	C	D	D
G117u3	WIAF-10407	HT27765	939	GTBP, G/T mismatch-binding protein	CCCACGTTAG[T/C]GGAGGTGGT	S	T	C	S	S
G117u4	WIAF-10411	HT27765	1622	GTBP, G/T mismatch-binding protein	CATTGTTGGA[G/A]ATTAGGACT	M	G	A	R	K
G117u5	WIAF-10412	HT27765	2405	GTBP, G/T mismatch-binding protein	GACAGCAGG[C/T]TATAATGTAT	M	C	T	A	V
G117u6	WIAF-10413	HT27765	2387	GTBP, G/T mismatch-binding protein	AAGAGTCAGA[A/T]CCACCCAGAC	M	A	T	N	I
G125u1	WIAF-10371	HT28632	1999	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	CAGTAATTT[C/T]CTCATCTTGT	M	C	T	P	S
G125u2	WIAF-10372	HT28632	2631	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	TAATGAATGA[C/A]ATTGCAGATA	M	C	A	D	E
G125u3	WIAF-10373	HT28632	3084	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	CAATGGAAGA[T/G]GTTCTTGAAC	M	T	G	D	E
G125u5	WIAF-10375	HT28632	4767	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	CACCTATACC[C/T]CTTGCTATG	S	C	T	P	P
G125u6	WIAF-10383	HT28632	8713	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	ATTCTTGGAT[C/T]CAGCTATTGG	M	C	T	P	S

G125u7	WIAF-10396	HT28632	1825	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	GACTTTGGCA [C/G]TGACCACCAG	M	C	G	L	V
G125u8	WIAF-10398	HT28632	2924	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	ACTACTGCTC [A/G]GACCACTACT	M	A	G	Q	R
G125u9	WIAF-10405	HT28632	8967	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	TTGAAGGTG [C/T]TTCAGAAAGAT	S	C	T	V	V
G125u10	WIAF-10408	HT28632	6954	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	CCAAACACCT [T/C]GTAGAACTCT	S	T	C	L	L
G125u11	WIAF-10409	HT28632	6855	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	TTCAGGAGCC [T/C]ATCATGSGCTC	S	T	C	P	P
G125u12	WIAF-10410	HT28632	6801	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	TATATATTAA [G/T]TGCAGAAAC	M	G	T	K	N
G125u13	WIAF-10421	HT28632	335	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	CATTGAGATT [C/G]CAAAACAAGGA	M	C	G	S	C
G125u14	WIAF-11607	HT28632	3966	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	TTCCACATCT [G/A]GTGATTAGAA	S	G	A	L	L
G125a15	WIAF-13130	HT28632	8642	ATM, ataxia telangiectasia mutated (includes complementation groups A, C and D)	GAGAAATATG [A/C]AGTCTTCATG	M	A	C	E	A
G136u1	WIAF-10388	HT3337	535 [2]	MLH1, mutL (E. coli) homolog 1 (colon cancer, nonpolyposis type [2])	AGGAGAAAAG [C/T]TTTAAAAAAT	M	C	T	A	V

G136u2	WIAF-10389	HT3337	MLH1, mutL (E. coli) homolog 1 (colon cancer, nonpolyposis type 769 2)	FOS, v-fos FBJ murine osteosarcoma viral oncogene homolog	TTCAAATGA [A/G] TGGTTACATA	M	A	G	N	S
G144u1	WIAF-11638	HT3625	1129	684	CCTGTGCAC [C/T] CGGTGTCAC	M	C	T	P	S
G1461u1	WIAF-12562	HT0129	684	PRB-binding protein	TTGCCAAGAA [G/A] TCAAGAACC	S	G	A	K	K
G1466u1	WIAF-12571	HT27849	2128	API2, apoptosis inhibitor 2	ATGATCCATG [G/C] GTAGAACATG	M	G	C	W	C
G1468u1	WIAF-12563	HT4986	1928	apoptosis inhibitor, neuronal	CCACCAGACC [A/T] GACGAGGGC	S	A	T	P	P
G1468u2	WIAF-12564	HT4986	3057	apoptosis inhibitor, neuronal	TTTGCRAATC [C/G] TTCAAGGGAG	M	C	G	L	V
G1472u1	WIAF-12565	HT28478	242	BAK1, BCL2-antagonist/killer 1	GGCAGAGATG [C/T] GGAGAGCCTG	S	C	T	C	C
G1472u2	WIAF-12572	HT28478	509	BAK1, BCL2-antagonist/killer 1	TGCAGCCAC [G/A] GCAGAGAATG	S	G	A	T	T
G1473u1	WIAF-12568	HT28606	394	CASP6, caspase 6, apoptosis- related cysteine protease	GGTGTCAACT [G/C] TTAGCCACGC	M	G	C	V	L
G1473u2	WIAF-12576	HT28606	411	CASP6, caspase 6, apoptosis- related cysteine protease	ACGCAGATGC [C/T] GATTGCTTTG	S	C	T	A	A
G1479u1	WIAF-12550	Y09077	711	ATR, ataxia telangiectasia and Rad3 related	ACTTTATTAA [T/C] GGTCTTACT	M	T	C	M	T
G1479u2	WIAF-12551	Y09077	4303	ATR, ataxia telangiectasia and Rad3 related	TTGCCTATGC [T/C] GATAATAGCC	S	T	C	A	A
G1479u3	WIAF-12552	Y09077	1894	ATR, ataxia telangiectasia and Rad3 related	ATTCTGATGA [T/C] GGCTGTTTAA	S	T	C	D	D
G1479u4	WIAF-12553	Y09077	1855	ATR, ataxia telangiectasia and Rad3 related	ATTTATGTGG [T/A] ATGCTCTCAC	S	T	A	G	G
G1479u5	WIAF-12558	Y09077	5287	ATR, ataxia telangiectasia and Rad3 related	TCATTCAATTA [T/C] CATGGTGTAG	S	T	C	Y	Y

G1479u6	WIAF-12559	Y09077	5539	ATR, ataxia telangiectasia and Rad3 related	CAGCTTTTAA [T/C] GACTCACTGA	S	T	C	Y	Y
G1479u7	WIAF-12569	Y09077	1540	ATR, ataxia telangiectasia and Rad3 related	ATCCTGTTAT [T/C] GAGATGTTAG	S	T	C	I	I
G1479u8	WIAF-12570	Y09077	2521	ATR, ataxia telangiectasia and Rad3 related	ATTTAATGGA [A/G] GATCCAGACA	S	A	G	S	E
G1482u1	WIAF-12560	HT27870	3176	BLM, Bloom syndrome	AAAATATAAC [G/A] GAAATCAGGA	S	G	A	T	T
G1482u2	WIAF-12561	HT27870	3605	BLM, Bloom syndrome	GAAATAAGC [C/A] CAACTGTAC	S	C	A	A	A
G1482u3	WIAF-12573	HT27870	2677	BLM, Bloom syndrome	TATGTATTAC [C/T] GAAAAAGCCT	M	C	T	P	L
G1483u1	WIAF-12597	HT1470	1910	MYBL2, v-myb avian myeloblastosis viral oncogene homolog-like 2	GGATGAGGAT [G/A] TGAAGCTGAT	M	G	A	V	M
G1483u2	WIAF-12610	HT1470	244	MYBL2, v-myb avian myeloblastosis viral oncogene homolog-like 2	ATGAGGAGGA [C/T] GAGCAGCTGA	S	C	T	D	D
G1483u3	WIAF-12611	HT1470	1406	MYBL2, v-myb avian myeloblastosis viral oncogene homolog-like 2	CACTGAGAAT [A/G] GCACCAGTCT	M	A	G	S	G
G1485u1	WIAF-12581	HT1432	1941	BCR, breakpoint cluster region	TGGAGATGAG [A/G] AAATGGGTCC	S	A	G	R	R
G1485u2	WIAF-12582	HT1432	3144	BCR, breakpoint cluster region	TGACCATCAA [T/C] AAGGAAGATG	S	T	C	N	N
G1485u3	WIAF-12583	HT1432	3777	BCR, breakpoint cluster region	ATAACAAGGA [T/C] GTGTCGGTGA	S	T	C	D	D
G1485u4	WIAF-12603	HT1432	2831	BCR, breakpoint cluster region	CAGATCAAGA [G/A] TGACATCCAG	M	G	A	S	N
G1485u5	WIAF-12608	HT1432	4217	BCR, breakpoint cluster region	ATCCCTGCCC [C/T] GGACAGCAAG	M	C	T	P	L
G1486u1	WIAF-12578	HT33770	1909	BRCA2, breast cancer 2, early onset	ATTGATAATG [G/A] AAGCTGGCCA	M	G	A	G	E
G1486u2	WIAF-12579	HT33770	3623	BRCA2, breast cancer 2, early onset	AGTTTAGAAA [A/G] CCAAGCTACA	S	A	G	K	K
G1486u3	WIAF-12586	HT33770	1341	BRCA2, breast cancer 2, early onset	AAATGTAGCA [A/C] ATCAGAAGCC	M	A	C	N	H
G1486u4	WIAF-12594	HT33770	446	BRCA2, breast cancer 2, early onset	CTTATAATCA [G/A] CTGGCTTCAA	S	G	A	Q	Q

G1486u5	WIAF-12598	HT33770	BRCA2, breast cancer 2, early onset	3013	BRCA2, breast cancer 2, early onset	ACCATGGTTT [T/C] ATATGAGAC	M	T	C	L	S
G1486u6	WIAF-12599	HT33770	BRCA2, breast cancer 2, early onset	3187	BRCA2, breast cancer 2, early onset	GAATAAATA [A/T] TGATTACATG	M	A	T	N	I
G1486u7	WIAF-12604	HT33770	BRCA2, breast cancer 2, early onset	4971	BRCA2, breast cancer 2, early onset	AGCATGTGAG [A/C] CCATTGAGAT	M	A	C	T	P
G1486u8	WIAF-12607	HT33770	BRCA2, breast cancer 2, early onset	4034	BRCA2, breast cancer 2, early onset	ATGATTCTGT [C/T] GTTCAATGT	S	C	T	V	V
G1487u1	WIAF-12584	HT27632	BRCA1, breast cancer 1, early onset	2536	BRCA1, breast cancer 1, early onset	AGTCAGTGTG [C/G] AGCATTGAA	M	C	G	A	G
G1487u2	WIAF-12587	HT27632	BRCA1, breast cancer 1, early onset	4697	BRCA1, breast cancer 1, early onset	CATCTCAAGA [G/C] GAGCTCATTA	M	G	C	E	D
G1487u3	WIAF-12595	HT27632	BRCA1, breast cancer 1, early onset	469	BRCA1, breast cancer 1, early onset	TCTCCTGAAC [A/G] TCTAAAGAT	M	A	G	H	R
G1487u4	WIAF-12600	HT27632	BRCA1, breast cancer 1, early onset	3667	BRCA1, breast cancer 1, early onset	AGCGTCCAGA [A/G] AGGAGAGCTT	M	A	G	K	R
G1487u5	WIAF-12601	HT27632	BRCA1, breast cancer 1, early onset	3537	BRCA1, breast cancer 1, early onset	TATGGGAAT [A/G] GTCATGCATC	M	A	G	S	G
G1487u6	WIAF-12602	HT27632	BRCA1, breast cancer 1, early onset	4956	BRCA1, breast cancer 1, early onset	ATCTGCCAG [A/G] GTCCAGCTGC	M	A	G	S	G
G1487u7	WIAF-12605	HT27632	BRCA1, breast cancer 1, early onset	2090	BRCA1, breast cancer 1, early onset	AGTACACCA [A/G] ATGCCAGTCA	S	A	G	Q	Q
G1487u8	WIAF-12614	HT27632	BRCA1, breast cancer 1, early onset	233	BRCA1, breast cancer 1, early onset	TCTCCACAA [G/A] TGTGACCACA	S	G	A	K	K
G1492u1	WIAF-12585	HT3506	cell death-associated kinase	3912	cell death-associated kinase	TCCAGGTCCG [T/C] GGCCTGGAGA	S	T	C	R	R
G1492u2	WIAF-12593	HT3506	cell death-associated kinase	4352	cell death-associated kinase	TACAACACCA [A/G] TAACGGGGCT	M	A	G	N	S
G1492u3	WIAF-12606	HT3506	cell death-associated kinase	2127	cell death-associated kinase	GCAATTGGA [C/T] ATCTCCAACA	S	C	T	D	D
G1492u4	WIAF-12612	HT3506	cell death-associated kinase	1605	cell death-associated kinase	TGAATTTTCT [C/T] AGTGAGAACA	S	C	T	L	L
G1494u1	WIAF-12589	HT28507	cell death-inducing protein Bik	366	cell death-inducing protein Bik	TTCAACACAC [T/C] TAAGGAGAAC	M	T	C	L	P
G1495u1	WIAF-12580	HT27803	CSE1L, chromosome segregation 1 (yeast homolog)-like	759	CSE1L, chromosome segregation 1 (yeast homolog)-like	TTCTTCCCT [G/C] ATCCTGATCT	S	G	C	L	L
G1501u1	WIAF-13502	HT1949	MCC, mutated in colorectal cancers	1181	MCC, mutated in colorectal cancers	CAGCAATGAC [A/C] TTCCCATCGC	M	A	C	I	L

G1501u2	WIAP-13503	HT1949	MCC, mutated in colorectal cancers	1753	CAGCTGAGAA [C/T] GCTGCAAGG	S	C	T	N	N
G1501u3	WIAP-13504	HT1949	MCC, mutated in colorectal cancers	2344	TGTCCTTAGC [T/C] GNACTCAGGA	S	T	C	A	A
G1501u4	WIAP-13521	HT1949	MCC, mutated in colorectal cancers	445	ACCGAACGAC [G/A] CTTCGCTATG	S	G	A	T	T
G1501u5	WIAP-13522	HT1949	MCC, mutated in colorectal cancers	1504	AAAGCAATGC [T/C] GAGAGGATGA	S	T	C	A	A
G1501u6	WIAP-13527	HT1949	MCC, mutated in colorectal cancers	2511	TTCGTGAATG [A/G] TCTAAAGCGG	M	A	G	D	G
G1502u1	WIAP-12633	HT1547	CCND1, cyclin D1 (PRAD1; parathyroid adenomatosis 1)	870	AGTGTGACCC [A/G] GACTGCGCTCC	S	A	G	P	P
G1503u1	WIAP-13741	U37022	CDK4, cyclin-dependent kinase 4	1151	CATGCCAATT [G/A] CATCGTTTAC	M	G	A	C	Y
G1503u2	WIAP-13742	U37022	CDK4, cyclin-dependent kinase 4	1410	CTGAAGCCGA [C/T] CAGTTGGGCA	S	C	T	D	D
G1503u3	WIAP-13743	U37022	CDK4, cyclin-dependent kinase 4	1328	TATGCAACAC [C/T] TGTGACATG	M	C	T	P	L
G1503u4	WIAP-13780	U37022	CDK4, cyclin-dependent kinase 4	1194	TTCTGGTGAAC [A/G] AGTGGTGGNA	S	A	G	T	T
G1503u5	WIAP-13781	U37022	CDK4, cyclin-dependent kinase 4	1443	TGATTGGGCT [G/A] CCTCCAGAGG	S	G	A	L	L
G1503u6	WIAP-13787	U37022	CDK4, cyclin-dependent kinase 4	1633	CTCTTATCTA [C/T] ATAAGGATGA	M	C	T	H	Y
G1517u1	WIAP-12618	HT1132	ERBB3, v-erb-b2 avian erythroblastic leukemia viral oncogene homolog 3	3894	CAGACCTCAG [T/C] CCCTCTCTGG	S	T	C	S	S
G152u1	WIAP-11608	HT3854	HSPAL1, heat shock 70KD protein- like 1	1673	GTGAGTGATG [A/C] AGGTTTGAAG	M	A	C	E	A
G152u2	WIAP-11629	HT3854	HSPAL1, heat shock 70KD protein- like 1	1683	AAGTTTGAAG [G/A] GGCAGATTA	S	G	A	K	K
G152u3	WIAP-11609	HT3854	HSPAL1, heat shock 70KD protein- like 1	1478	GTACACAGCA [C/T] GGACAAAGAGC	M	C	T	T	M
G152u4	WIAP-11610	HT3854	HSPAL1, heat shock 70KD protein- like 1	1443	TGACGTTTGA [C/T] ATTGATGCCA	S	C	T	D	D
G1520u1	WIAP-12162	HT1175	DNA excision repair protein ERCC2, 5' end	2211	TGACCGTGA [C/T] GAGGCTGTCC	S	C	T	D	D

G1520u2	WIAF-12166	HT1175		546	DNA excision repair protein ERCC2, 5' end	CCCACTGCCG [A/C] TTTCTATAGG	S	A	C	R	R
G1527u1	WIAF-12168	HT0086		577	GSTM2, glutathione S-transferase (muscle)	TCATCTCCG [A/C] TTTGAGGCT	S	A	C	R	R
G1527u2	WIAF-12169	HT0086		644	GSTM2, glutathione S-transferase (muscle)	ACCTGTGTC [A/T] CAAAGATGGC	M	A	T	T	S
G1527u3	WIAF-12171	HT0086		100	GSTM2, glutathione S-transferase (muscle)	ACTCAAGCTA [C/T] GAGGAAAAGA	S	C	T	Y	Y
G1527u4	WIAF-12172	HT0086		41	GSTM2, glutathione S-transferase (muscle)	GGGTACTGG [A/G] ACATCCCGG	M	A	G	N	D
G1527u5	WIAF-12173	HT0086		215	GSTM2, glutathione S-transferase (muscle)	GATTGATGG [A/G] CTCACAAGAT	M	A	G	T	A
G1527u6	WIAF-12194	HT0086		238	GSTM2, glutathione S-transferase (muscle)	CCCAGAGCAA [T/C] GCCATCCTGC	S	T	C	N	N
G1528u1	WIAF-11950	HT1811		529	GSTM3, glutathione S-transferase (brain)	GTATATTGA [C/G] CCCAAGTGCC	M	C	G	D	E
G1528u2	WIAF-11951	HT1811		674	GSTM3, glutathione S-transferase (brain)	CAACAAGCCT [G/A] TATGCTGAGC	M	G	A	V	I
G1528u3	WIAF-11989	HT1811		572	GSTM3, glutathione S-transferase (brain)	GGCTTTCATG [T/G] GCCGTTTGA	M	T	G	C	G
G1528u4	WIAF-13470	HT1811		240	GSTM3, glutathione S-transferase (brain)	CAGAGCAATG [C/A] CATCTTGCGC	M	C	A	A	D
G1529u1	WIAF-14146	HT2006		797	GSTM4, glutathione S-transferase	TGGACGCCCT [C/T] CCAAACTGA	S	C	T	F	F
G153u1	WIAF-12163	HT3856		1212	HSPA1B, heat shock 70kD protein 1	TGGGGCTGGA [G/A] ACGCCCGAG	S	G	A	E	E
G153u2	WIAF-12182	HT3856		676	HSPA1B, heat shock 70kD protein 1	GGCCGGGAC [A/G] CCCACCTGGG	M	A	G	T	A
G153u3	WIAF-12183	HT3856		1695	HSPA1B, heat shock 70kD protein 1	TCAGCGAGGC [C/G] GACAAGAAGA	S	C	G	A	A
G153u4	WIAF-12189	HT3856		330	HSPA1B, heat shock 70kD protein 1	ACRAGGGGA [G/C] ACCNAGCAT	M	G	C	E	D
G153u5	WIAF-12190	HT3856		1053	HSPA1B, heat shock 70kD protein 1	AGCTGCTGCA [A/G] GACTTCTTCA	S	A	G	Q	Q
G1530u1	WIAF-11964	HT3010		673	GSTM5, glutathione S-transferase	ATTCCTCGA [G/A] GTCTTTTGT	M	G	A	G	S
G1530u2	WIAF-11995	HT3010		593	GSTM5, glutathione S-transferase	GACGCCCTCC [T/C] AAACCTGNAG	M	T	C	L	P

G15330u3	WIAF-13473	HT3010	693 M5	GSTM5, glutathione S-transferase	TTGAAAGTC [A/G] GCTACATGGA	S	A	G	S	S
G15330u1	WIAF-13458	HT27460	543	GSTT2, glutathione S-transferase theta 2	CTCTCGGCTA [C/T] GAACCTGTTTG	S	C	T	Y	Y
G15330u2	WIAF-13460	HT27460	417	GSTT2, glutathione S-transferase theta 2	GGACTGCCAT [G/A] GACCAGGCC	M	G	A	M	I
G15330u3	WIAF-13461	HT27460	359	GSTT2, glutathione S-transferase theta 2	CAGGTGTGG [G/A] GCCACTCAAT	M	G	A	G	E
G15330u4	WIAF-13462	HT27460	363	GSTT2, glutathione S-transferase theta 2	TGTTGGGGCC [A/C] CTCATTTGGG	S	A	C	P	P
G15330u5	WIAF-13463	HT27460	385	GSTT2, glutathione S-transferase theta 2	CCAGGTGCC [G/A] AGGAGAAGGT	M	G	A	E	K
G15330u1	WIAF-11952	HT0436	517	HCK, hemopoietic cell kinase	CCGCGTTGAC [T/C] CTCCTGGAGAC	M	T	C	S	P
G15330u2	WIAF-12013	HT0436	783	HCK, hemopoietic cell kinase	TGGACCACTA [C/T] AAGAAGGGA	S	C	T	Y	Y
G15330u3	WIAF-13464	HT0436	357	HCK, hemopoietic cell kinase	TCATCGTGGT [T/C] GCCCTGTATG	S	T	C	V	V
G15330u4	WIAF-13465	HT0436	387	HCK, hemopoietic cell kinase	CCATTACCA [C/T] GAAGACCTCA	S	C	T	H	H
G15330u5	WIAF-13466	HT0436	471	HCK, hemopoietic cell kinase	CCCTGGCCAC [C/G] CGGAAGGAGG	S	C	G	T	T
G15330u6	WIAF-13467	HT0436	240	HCK, hemopoietic cell kinase	CCAGGCCAG [C/T] CCNACCTGTC	S	C	T	S	S
G15330u7	WIAF-13468	HT0436	394	HCK, hemopoietic cell kinase	CCACGAAGAC [C/T] TCAGCTTCCA	M	C	T	L	F
G15330u1	WIAF-12020	U04045	1514	MSH2, mutS (E. coli) homolog 2 (colon cancer, nonpolyposis type 1)	GTGAATTAAAG [A/G] GAAATAATGA	S	A	G	R	R
G15330u2	WIAF-12044	U04045	599	MSH2, mutS (E. coli) homolog 2 (colon cancer, nonpolyposis type 1)	GACTGTGTGA [A/T] TTCCTTGATA	M	A	T	E	D
G15330u3	WIAF-12045	U04045	1452	MSH2, mutS (E. coli) homolog 2 (colon cancer, nonpolyposis type 1)	AGATATGGAT [C/T] AGGTGGAAGA	N	C	T	Q	*
G15330u4	WIAF-12076	U04045	938	MSH2, mutS (E. coli) homolog 2 (colon cancer, nonpolyposis type 1)	GACAGTTTGA [A/T] CTGACTACTT	M	A	T	E	D



G1537u5	WIAP-12077	U04045	1878 [1]	MSH2, muts (E. coli) homolog 2 (colon cancer, nonpolyposis type)	TCAGCTAGAT [G/A] CTGTTGTCAG	M	G	A	A	T
G1543u1	WIAP-13856	J00119	553	MOS, v-mos Moloney murine sarcoma viral oncogene homolog	GAGTTTCTGG [G/T] CTGAGCTCAA	M	G	T	A	S
G1543u2	WIAP-13857	J00119	621	MOS, v-mos Moloney murine sarcoma viral oncogene homolog	GCACGGGCAC [G/A] CCCGAGGGT	S	G	A	T	T
G1544u1	WIAP-12018	U59464	3821	PTCH, patched (Drosophila)	CATCCGAAAT [C/T] CAGGCATCAC	M	C	T	S	F
G1544u2	WIAP-12019	U59464	3618	PTCH, patched (Drosophila)	GGTGTGTCGG [C/T] TTCGCCATGC	S	C	T	R	R
G1544u3	WIAP-12027	U59464	1761	PTCH, patched (Drosophila)	ATTTGCCAT [G/T] GTTCTGCTCA	M	G	T	M	I
G1544u4	WIAP-12029	U59464	4074	PTCH, patched (Drosophila)	CTGCCATGGG [C/T] AGTCCGTCG	S	C	T	G	G
G1544u5	WIAP-12043	U59464	3845	PTCH, patched (Drosophila)	CCCTCGAACC [C/T] GAGACAGCAG	M	C	T	P	L
G1544u6	WIAP-12056	U59464	1433	PTCH, patched (Drosophila)	CTGCTGGTTG [C/T] ACTGTCACTG	M	C	T	A	V
G1544u7	WIAP-12058	U59464	3298	PTCH, patched (Drosophila)	CACCGTTTAC [G/C] TTGCTTTGGC	M	G	C	V	L
G1544u8	WIAP-12062	U59464	3986	PTCH, patched (Drosophila)	TCTACTGAAG [G/A] GCATTCCTGGC	M	G	A	G	E
G1544u9	WIAP-13489	U59464	1665	PTCH, patched (Drosophila)	CCATCAGCAA [T/C] GTCACAGCCT	S	T	C	N	N
G1544u10	WIAP-13490	U59464	2396	PTCH, patched (Drosophila)	AAATACCTTT [C/T] TTTCTACAAC	M	C	T	S	F
G1544u11	WIAP-13491	U59464	2199	PTCH, patched (Drosophila)	GGACACTCTC [A/G] TCTTTTGCTG	S	A	G	S	S
G1544u12	WIAP-13492	U59464	2222	PTCH, patched (Drosophila)	AAGACTATAG [C/T] TCCTTTCCTC	M	C	T	A	V
G1544u13	WIAP-13500	U59464	1686	PTCH, patched (Drosophila)	TCTTCATGGC [C/T] GCGTTAATCC	S	C	T	A	A
G1545u1	WIAP-12032	HT0473	1835	RAG1, recombination activating gene 1	GGACATGGAA [G/A] AAGACATCTT	M	G	A	E	K
G1545u2	WIAP-12035	HT0473	2519	RAG1, recombination activating gene 1	TGACATTGGC [A/G] ATGCAGCTGA	M	A	G	N	D

G1545u3	WIAP-12046	HT0473	3045	RAG1, recombination activating gene 1	CGGAATATGA [A/G]TGCAGGCAG	M	A	G	N	S
G1545u4	WIAP-12047	HT0473	3146	RAG1, recombination activating gene 1	TCATAATGCA [T/C]TAAAAACCTC	S	T	C	L	L
G1545u5	WIAP-12075	HT0473	2513	RAG1, recombination activating gene 1	CCACTGTGAC [A/T]TTGCAATGC	M	A	T	I	P
G1545u6	WIAP-13484	HT0473	1322	RAG1, recombination activating gene 1	GTCGCTGACT [C/T]GGAGAGCTCA	M	C	T	R	W
G1545u7	WIAP-13494	HT0473	2571	RAG1, recombination activating gene 1	GAAGTGATATA [A/G]GAATCCCAAT	M	A	G	K	R
G1545u8	WIAP-13498	HT0473	1018	RAG1, recombination activating gene 1	TTCTGGCTGA [C/A]CCTGTGGAGA	M	C	A	D	E
G1545u9	WIAP-13499	HT0473	2782	RAG1, recombination activating gene 1	ATCTTTACCT [G/C]AAGATGAAC	S	G	C	L	L
G1548u1	WIAP-12015	HT4999	133	IFI27, interferon, alpha-inducible protein 27	CTCTGCCGTA [G/A]TTTGGCCCT	M	G	A	V	I
G1548u2	WIAP-13482	HT4999	380	IFI27, interferon, alpha-inducible protein 27	ATCTGGGCT [C/T]CATTTGGGTCT	M	C	T	S	F
G1548u3	WIAP-13483	HT4999	135	IFI27, interferon, alpha-inducible protein 27	CTGCCGTAGT [T/C]TTGCCCTGG	S	T	C	V	V
G155u1	WIAP-11634	HT3962	991	CHC1, chromosome condensation 1	AGCTGGATGT [G/A]CCTGTGGTAA	S	G	A	V	V
G155u2	WIAP-11635	HT3962	1271	CHC1, chromosome condensation 1	CGGCTTCGGC [C/T]TCTCCAACTA	M	C	T	L	P
G155u3	WIAP-11636	HT3962	1192	CHC1, chromosome condensation 1	GCCGGGGCCA [C/T]GTGAGATTCC	S	C	T	H	H
G155u4	WIAP-11637	HT3962	1267	CHC1, chromosome condensation 1	TGTACGGCTT [C/T]GGCCTCTCCA	S	C	T	F	P
G155u5	WIAP-11649	HT3962	1657	CHC1, chromosome condensation 1	TGATGGGCAA [A/G]CAGCTGGAGA	S	A	G	K	K
G1550u1	WIAP-12057	M16038	611	LYN, v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	GCAAAGTCCC [T/G]TTTAACAAAA	M	T	G	L	R
G1550u2	WIAP-12061	M16038	1371	LYN, v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	TGGCATACAT [C/T]GAGCGGAAGA	S	C	T	I	I
G1550u3	WIAP-12080	M16038	1059	LYN, v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	AAAGGCTTGG [C/T]GCTGGGCAGT	S	C	T	G	G

G1550u4	WIAP-12081	M16038	996	LYN, v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	AGCCACAGAA [G/A]CCATGGGATA	S	G	A	K	K
G1552u1	WIAP-12030	HT4578	2355	PMS1, postmeiotic segregation increased (S. cerevisiae) 1	CCTGCTATTT [A/T]AAAGACTTCT	N	A	T	K	*
G1552u2	WIAP-12031	HT4578	2231	PMS1, postmeiotic segregation increased (S. cerevisiae) 1	ACAAAGTTGA [C/T]TTAGAAGAGA	S	C	T	D	D
G1552u3	WIAP-12040	HT4578	617	PMS1, postmeiotic segregation increased (S. cerevisiae) 1	TCATGAGCTT [T/C]GGTATCCTTA	S	T	C	P	F
G1552u4	WIAP-12063	HT4578	1723	PMS1, postmeiotic segregation increased (S. cerevisiae) 1	TCATGTAAACA [A/G]AAAATCAAT	M	A	G	K	R
G1552u5	WIAP-12064	HT4578	1732	PMS1, postmeiotic segregation increased (S. cerevisiae) 1	AAAAATCAA [A/G]TGTAATAGAT	M	A	G	N	S
G1552u6	WIAP-12065	HT4578	1660	PMS1, postmeiotic segregation increased (S. cerevisiae) 1	TTACCATGTA [A/G]AGTAAGTAAT	M	A	G	K	R
G1552u7	WIAP-12066	HT4578	1975	PMS1, postmeiotic segregation increased (S. cerevisiae) 1	GAACGATACA [A/G]TAGTCAAATG	M	A	G	N	S
G1552u8	WIAP-12067	HT4578	1981	PMS1, postmeiotic segregation increased (S. cerevisiae) 1	TTTAGAGGAT [G/T]CAACACTACA	M	G	T	A	S
G1552u9	WIAP-12068	HT4578	2454	PMS1, postmeiotic segregation increased (S. cerevisiae) 1	TTTAGACGTT [T/A]TATATAAAT	M	T	A	L	I
G1552u10	WIAP-12069	HT4578	2457	PMS1, postmeiotic segregation increased (S. cerevisiae) 1	AGACGTTTTA [T/C]ATATAAATGAC	M	T	C	Y	H
G1552u11	WIAP-12082	HT4578	2557	PMS1, postmeiotic segregation increased (S. cerevisiae) 1	ATACCAGGAG [T/C]TTCATTAAT	M	T	C	V	A
G1552u12	WIAP-12083	HT4578	971	PMS1, postmeiotic segregation increased (S. cerevisiae) 1	TTTTCTTTCT [G/T]AAAATCGATG	S	G	T	L	L

G1554u1	WIAF-12028	HT4161	1500	ELK3, ELK3, ETS-domain protein (SRF accessory protein 2) NOTE: Symbol and name provisional.	CTCAGAAATC[C/T]TGATGCGTC	S	C	T	S	S
G1554u2	WIAF-12059	HT4161	1380	ELK3, ELK3, ETS-domain protein (SRF accessory protein 2) NOTE: Symbol and name provisional.	CTGCCAGGCT[G/A]CAAGGGCCAA	S	G	A	L	L
G1554u3	WIAF-12060	HT4161	1436	ELK3, ELK3, ETS-domain protein (SRF accessory protein 2) NOTE: Symbol and name provisional.	CACATGCCAG[T/C]GCCAATCCCC	M	T	C	V	A
G1562u1	WIAF-12024	HT28220	804	PDCD1, programmed cell death 1	GGGGCTCAGC[T/C]GACGGCCCTC	S	T	C	A	A
G1562u2	WIAF-13488	HT28220	644	PDCD1, programmed cell death 1	GACCCCTCAG[C/T]CGTGCCTGTG	M	C	T	A	V
G1563u1	WIAF-13493	HT1187	1748	EGFR, epidermal growth factor receptor (avian erythroblastic leukemia viral (v-erb-b) oncogene homolog)	CCGAGGCCCA[G/A]GGACTGCGTC	M	G	A	R	K
G1563u2	WIAF-13497	HT1187	2073	EGFR, epidermal growth factor receptor (avian erythroblastic leukemia viral (v-erb-b) oncogene homolog)	ACGGATGCAC[T/A]GGGCCAGGTC	S	T	A	T	T
G1566u1	WIAF-12016	HT27594	235	PDCD2, programmed cell death 2	GGCCCGCTGC[C/G]TGGCCGCCCG	M	C	G	P	R
G1566u2	WIAF-12033	HT27594	904	PDCD2, programmed cell death 2	TTGGAATTCC[A/G]GGTCATGCCT	M	A	G	Q	R
G1566u3	WIAF-12041	HT27594	331	PDCD2, programmed cell death 2	AATCAACTAC[C/T]CAGGAATAAC	M	C	T	P	L
G1566u4	WIAF-12071	HT27594	649	PDCD2, programmed cell death 2	CCTGAGGTTG[T/C]GGAAAGGAA	M	T	C	V	A
G1566u5	WIAF-12072	HT27594	633	PDCD2, programmed cell death 2	AGAAGATGAG[A/T]TTATGCTGA	M	A	T	I	F
G1567u1	WIAF-12042	M95936	293	AKT2, v-akt murine thymoma viral oncogene homolog 2	GAGAGCCCGC[G/A]ACCCACACCC	M	G	A	R	Q

G1572u1	WIAF-12212	HT3998	1894	proto-oncogene c-abl, tyrosine protein kinase, alt. transcript 2	TGTTCCAGGA [A/G] TCCAGTATCT	S	A	G	E	E
G1572u2	WIAF-12233	HT3998	3694	proto-oncogene c-abl, tyrosine protein kinase, alt. transcript 2	AGCTTCAGAT [C/T] TGCCCGCGCA	S	C	T	I	I
G1572u3	WIAF-12234	HT3998	3721	proto-oncogene c-abl, tyrosine protein kinase, alt. transcript 2	GCAGTGGTCC [G/A] GCGGCCACTC	S	G	A	P	P
G1573u1	WIAF-12021	HT0642	343	CBL, Cas-Br-M (murine) ecotropic retroviral transforming sequence	TCAATGACAA [G/C] GTGGTGGGT	M	G	C	K	N
G1573u2	WIAF-12022	HT0642	363	CBL, Cas-Br-M (murine) ecotropic retroviral transforming sequence	TTGTGTGAGA [A/T] CCCAAAGCTG	M	A	T	N	I
G1573u3	WIAF-12034	HT0642	2364	CBL, Cas-Br-M (murine) ecotropic retroviral transforming sequence	AATATTCACT [C/T] CCAGGGGCCA	M	C	T	S	F
G1573u4	WIAF-12049	HT0642	387	CBL, Cas-Br-M (murine) ecotropic retroviral transforming sequence	CTAAGAATA [G/A] CCCACCTTAT	M	G	A	S	N
G1573u5	WIAF-12050	HT0642	947	CBL, Cas-Br-M (murine) ecotropic retroviral transforming sequence	AATCATCCT [G/A] GCTACATGGC	M	G	A	G	S
G1573u6	WIAF-12070	HT0642	2740	CBL, Cas-Br-M (murine) ecotropic retroviral transforming sequence	TCGAGAACCT [C/T] ATGATCAGG	S	C	T	L	L
G1573u7	WIAF-12073	HT0642	661	CBL, Cas-Br-M (murine) ecotropic retroviral transforming sequence	TCTTTCCAAG [T/C] GGACTCTTTC	S	T	C	S	S
G1573u8	WIAF-12074	HT0642	2569	CBL, Cas-Br-M (murine) ecotropic retroviral transforming sequence	CTCTGGATGG [T/C] GATCCTACAA	S	T	C	G	G
G1573u9	WIAF-13486	HT0642	2006	CBL, Cas-Br-M (murine) ecotropic retroviral transforming sequence	CCGGCACTCA [C/T] TTCCATTTTC	M	C	T	L	P

G1574u1	WIAF-12037	HT1508	2493	FES, feline sarcoma (Snyder-Theilen) viral (v-fes)/Fujinami avian sarcoma (PRCII) viral (v-fes) oncogene homolog	AGCGCCCCAG [C/T] TTCAGCACCA	S	C	T	S	S
G1574u2	WIAF-12051	HT1508	189	FES, feline sarcoma (Snyder-Theilen) viral (v-fes)/Fujinami avian sarcoma (PRCII) viral (v-fes) oncogene homolog	CCGAGCGGT [C/T] AAGAGTGACA	S	C	T	V	V
G1574u3	WIAF-12052	HT1508	1441	FES, feline sarcoma (Snyder-Theilen) viral (v-fes)/Fujinami avian sarcoma (PRCII) viral (v-fes) oncogene homolog	GAAGCCCTG [C/T] ATGAGCAGCT	M	C	T	H	Y
G1574u4	WIAF-12053	HT1508	2202	FES, feline sarcoma (Snyder-Theilen) viral (v-fes)/Fujinami avian sarcoma (PRCII) viral (v-fes) oncogene homolog	GAGAGGAGC [C/T] GATGGGTCT	S	C	T	A	A
G1574u5	WIAF-12054	HT1508	2088	FES, feline sarcoma (Snyder-Theilen) viral (v-fes)/Fujinami avian sarcoma (PRCII) viral (v-fes) oncogene homolog	CTGCTGGCAT [G/T] GAGTACCTGG	M	G	T	M	I
G1574u6	WIAF-12078	HT1508	1577	FES, feline sarcoma (Snyder-Theilen) viral (v-fes)/Fujinami avian sarcoma (PRCII) viral (v-fes) oncogene homolog	GATGGTCTGC [C/T] CCGGCACCTTC	M	C	T	P	L
G1574u7	WIAF-13495	HT1508	579	FES, feline sarcoma (Snyder-Theilen) viral (v-fes)/Fujinami avian sarcoma (PRCII) viral (v-fes) oncogene homolog	GTGACACAGC [T/C] AAGGACAAGT	S	T	C	A	A
G1575u1	WIAF-12079	HT1052	963	FGR, Gardner-Rasheed feline sarcoma viral (v-fgr) oncogene homolog	TGGGCACCGG [C/T] TGCTTCGGGG	S	C	T	G	G

					FGR, Gardner-Rasheed feline sarcoma viral (v-fgr) oncogene homolog	CAGAAGCTAC [G/A] GGGCAGCAGA	M	G	A	G	R
G1575u2	WIAP-13487	HT1052	232								
G1585u1	WIAP-12017	HT1675	996		CRK, v-crck avian sarcoma virus CT10 oncogene homolog	TGGATCAACA [G/A] AATCCCGATG	S	G	A	Q	Q
G1585u2	WIAP-12036	HT1675	446		CRK, v-crck avian sarcoma virus CT10 oncogene homolog	ACTACAACGT [T/C] GATAGAACCA	M	T	C	L	S
G1587u1	WIAP-12023	HT0590	1473		proto-oncogene dbl	GGCCAATCCA [A/G] TTTTGGTAC	S	A	G	Q	Q
G1587u2	WIAP-12025	HT0590	2549		proto-oncogene dbl	GTCACGCCT [C/T] TAATGTAGAT	M	C	T	S	F
G1587u3	WIAP-12026	HT0590	2828		proto-oncogene dbl	GCATCACAA [C/T] TGCAGAAATC	M	C	T	S	F
G1587u4	WIAP-12038	HT0590	982		proto-oncogene dbl	AAATTCTCAAG [G/C] AGCTATATTC	M	G	C	E	Q
G1587u5	WIAP-12039	HT0590	2343		proto-oncogene dbl	AACRAATGA [G/T] CGACACACTTT	M	G	T	Q	H
G1587u6	WIAP-12048	HT0590	683		proto-oncogene dbl	GACACTGAAG [G/A] AGCTGTCACT	M	G	A	Q	E
G1587u7	WIAP-12055	HT0590	2686		proto-oncogene dbl	TTCTCTTCAG [C/T] AGAATGATGA	N	C	T	Q	P
G1587u8	WIAP-13485	HT0590	2136		proto-oncogene dbl	ACTGTGAAG [T/A] TCTGCTCTCT	S	T	A	G	G
G1587u9	WIAP-13496	HT0590	1566		proto-oncogene dbl	AAAATCAGAG [C/T] AACTTAATAAA	S	C	T	S	S
G1590u1	WIAP-11616	HT4209	1059		RAD23B, RAD23 (S. cerevisiae) homolog B	ACTACTGGGG [C/T] TCCTCAGTCT	M	C	T	A	V
G1590u1	WIAP-13897	HT2455	1257		ETS2, v-ets avian erythroblastosis virus E26 oncogene homolog 2	GCCAGTCTCT [C/G] TGCCTCAATA	S	C	G	L	L
G1590u2	WIAP-13913	HT2455	1107		ETS2, v-ets avian erythroblastosis virus E26 oncogene homolog 2	ATTCTGGGAC [T/G] CCCAAGACC	S	T	G	T	T
G1590u3	WIAP-13914	HT2455	1314		ETS2, v-ets avian erythroblastosis virus E26 oncogene homolog 2	GGAGTGACCC [A/G] GTGGAGCAAG	S	A	G	P	P
G1591u1	WIAP-13924	HT2333	417		HRAS, v-Ha-ras Harvey rat sarcoma viral oncogene homolog	TCCAGAACCA [T/C] TTTTGGGAGC	S	T	C	H	H
G1595u1	WIAP-12262	HT33778	1302		proto-oncogene l-myc, alt. transcript 1	GCATACCTCA [G/C] TGGCTACTAA	M	G	C	S	T
G1597u1	WIAP-12243	HT0410	900		MAS1, MAS1 oncogene	CCATCTTGCT [C/T] GTGAAGATCC	S	C	T	V	V
G160u1	WIAP-11630	HT4247	690		RAD23A, RAD23 (S. cerevisiae) homolog A	AGAGCCAGGT [A/G] TCGGAGCAGC	S	A	G	V	V
G1602u1	WIAP-14180	HT1903	1321		proto-oncogene pim-1	GTCCGCCGGG [C/A] CCAGCAATA	M	C	A	P	T

G1604u1	WIAF-12319	HT2788	1182	REL, v-rel avian reticuloendotheliosis viral oncogene homolog	CCTCCCAAAG [T/C] GCTGGGATTA	S	T	C	S	S
G1609u1	WIAF-12358	HT33646	348	RIPK1, receptor (TNFRSF)- interacting serine-threonine kinase 1	GAGCAGGGT [C/T] TCCCATGACC	S	C	T	V	V
G161u1	WIAF-11654	HT4251	1522	DNA repair and recombination homolog RAD52	TATGATCCAT [C/T] TTAAC TGAGG	M	C	T	S	F
G1610a1	WIAF-12101	HT27727	501	replication protein Rpa4, 30 kDa	TGCAACTCCT [G/A] CTATTAAAGAC	M	G	A	A	T
G1610a2	WIAF-12102	HT27727	554	replication protein Rpa4, 30 kDa	TACCGTGTAA [C/T] GTGAACCGC	S	C	T	N	N
G1610u3	WIAF-12307	HT27727	450	replication protein Rpa4, 30 kDa	TTCTGCTGCT [G/A] ATGGAGCGAG	M	G	A	D	N
G1610u4	WIAF-12320	HT27727	1037	replication protein Rpa4, 30 kDa	TGATTCATGA [G/C] TGTCCTCATC	M	G	C	E	D
G1610u5	WIAF-12321	HT27727	857	replication protein Rpa4, 30 kDa	TAGAGGACAT [G/A] AACGAGTTCA	M	G	A	M	I
G1610u6	WIAF-12343	HT27727	539	replication protein Rpa4, 30 kDa	GAATTCAGGA [C/T] GTTGATCCGT	S	C	T	D	D
G1630u1	WIAF-12302	HT3563	4312	DCC, deleted in colorectal carcinoma	ACTCATGAAG [C/T] AGCTTAATGC	N	C	T	Q	*
G1632u1	WIAF-13572	HT27355	742	tumor suppressor, PDGF receptor beta-like	TTTATGACAT [G/C] AAGCGGGGCT	M	G	C	M	I
G1632u2	WIAF-13584	HT27355	1102	tumor suppressor, PDGF receptor beta-like	TGCAAGACTT [C/T] GAGACGATTG	S	C	T	F	F
G1632u3	WIAF-13601	HT27355	258	tumor suppressor, PDGF receptor beta-like	AAGACGAGT [C/T] TATCATGATG	M	C	T	S	F
G1633u1	WIAF-13957	HT1778	1263	FER, fer (fpe/fes related) tyrosine kinase (phosphoprotein NCP94)	TTCAGGCAAA [T/C] GAGATCATGT	S	T	C	N	N
G1633u2	WIAF-13958	HT1778	2407	FER, fer (fpe/fes related) tyrosine kinase (phosphoprotein NCP94)	TATGTTGTAT [C/T] TCGAGAGTAA	M	C	T	L	F
G1634u1	WIAF-13505	HT3216	1569	ELK1, ELK1, member of ETS oncogene family	TCTCGACCCC [C/T] GTGGTGCTCT	S	C	T	P	P
G1634u2	WIAF-13858	HT3216	456	ELK1, ELK1, member of ETS oncogene family	GGCTGTGGGG [A/G] CTACGCAAGA	S	A	G	G	G



G1634u3	WIAF-13859	HT3216	745	ELK1, ELK1, member of ETS oncogene family	AGCCCCAGGC[G/A]GTTTGGCAGC	M	G	A	G	S
G1638u1	WIAF-14172	HT1224	98	uracil-DNA glycosylase	GCTGGGACCT[G/C]TTCACAAAT	-	G	C	-	-
G1643u1	WIAF-13517	HT3751	629	DXS648E, DNA segment on chromosome X (unique) 648 expressed sequence	TACATCCCCA[G/A]TCGTGGCCCT	M	G	A	S	N
G1645u1	WIAF-14087	D21089	363	XPC, xeroderma pigmentosum, complementation group C	AAACCTCAA[G/A]GTTATAAGG	S	G	A	K	K
G1645u2	WIAF-14088	D21089	2166	XPC, xeroderma pigmentosum, complementation group C	TGCATTCCAG[G/A]GACACGTGGC	S	G	A	R	R
G1645u3	WIAF-14089	D21089	1580	XPC, xeroderma pigmentosum, complementation group C	GGGAGCCATC[G/A]TAAGGACCCA	M	G	A	R	H
G1645u4	WIAF-14090	D21089	1601	XPC, xeroderma pigmentosum, complementation group C	AGCTTGCCAG[T/C]GGCATCCTCA	M	T	C	V	A
G1645u5	WIAF-14091	D21089	2920	XPC, xeroderma pigmentosum, complementation group C	CCCATTTGAG[A/C]AGCTGTGAGC	M	A	C	K	Q
G1645u6	WIAF-14103	D21089	405	XPC, xeroderma pigmentosum, complementation group C	ATGACCTCAG[G/A]GACTTTCCAA	S	G	A	R	R
G1645u7	WIAF-14104	D21089	151	XPC, xeroderma pigmentosum, complementation group C	GGGACGGAA[C/G]TGCGCAGCCA	M	C	G	L	V
G1645u8	WIAF-14105	D21089	2133	XPC, xeroderma pigmentosum, complementation group C	AAGCGTCTA[C/T]TCCAGGGATT	S	C	T	Y	Y
G167u1	WIAF-11632	HT4579	83	PMS2L8, postmeiotic segregation increased 2-like 8	CCTATTGATC[G/A]GAAGTCAGTC	M	G	A	R	Q
G167u2	WIAF-11633	HT4579	219	PMS2L8, postmeiotic segregation increased 2-like 8	GAGTGGATCT[T/C]ATTGAAGTTT	S	T	C	L	L
G167u3	WIAF-11644	HT4579	768	PMS2L8, postmeiotic segregation increased 2-like 8	TGCCCCCTAG[T/C]GACTCCGTGT	S	T	C	S	S

G167u4	WIAP-11622	HT4579	1645	PMS2L8, postmeiotic segregation increased 2-like 8	GAAAGCGCT [G/A] AAACCTGACGA	M	G	A	B	K
G167u5	WIAP-11645	HT4579	1512	PMS2L8, postmeiotic segregation increased 2-like 8	ACTCGGGCA [C/T] GGCAGCACTT	S	C	T	H	H
G167u6	WIAP-11646	HT4579	1619	PMS2L8, postmeiotic segregation increased 2-like 8	TGCAGGAAC [A/G] TGTGGACTCT	M	A	G	H	R
G167u7	WIAP-11647	HT4579	1432	PMS2L8, postmeiotic segregation increased 2-like 8	CGTCTGTGGA [C/T] CTCAGAAAGA	M	C	T	P	S
G167u8	WIAP-11625	HT4579	2490	PMS2L8, postmeiotic segregation increased 2-like 8	GGACTGTCTT [T/C] AACACAAGCG	S	T	C	L	L
G167u9	WIAP-11619	HT4579	804	PMS2L8, postmeiotic segregation increased 2-like 8	TGAGCTGTTC [G/C] GATGCTCTGC	S	G	C	S	S
G167u10	WIAP-11623	HT4579	1555	PMS2L8, postmeiotic segregation increased 2-like 8	CATCCAGAC [A/G] CGGCGAGTCA	M	A	G	T	A
G167u11	WIAP-11624	HT4579	2364	PMS2L8, postmeiotic segregation increased 2-like 8	CCTTCGGACC [C/T] CAGGACGTGG	S	C	T	P	P
G167u12	WIAP-11626	HT4579	2348	PMS2L8, postmeiotic segregation increased 2-like 8	ACTAGTAAA [A/G] CTGGACCTTC	M	A	G	N	S
G181u1	WIAP-11697	HT48793	311 <sup>4</sup>	ERCC4, excision repair cross- complementing rodent repair deficiency, complementation group	ATATTGCGA [C/T] AACTAGGATA	M	C	T	T	I
G181u2	WIAP-11698	HT48793	295 <sup>4</sup>	ERCC4, excision repair cross- complementing rodent repair deficiency, complementation group	CACACAAGGT [G/C] GTGTTATATT	M	G	C	G	R
G181u3	WIAP-11699	HT48793	234 <sup>4</sup>	ERCC4, excision repair cross- complementing rodent repair deficiency, complementation group	TTGACACCT [C/T] CCTCGCCGTG	S	C	T	L	L

G181u4	WIAP-11704	HT48793		808 4	ERCC4, excision repair cross-complementing rodent repair deficiency, complementation group	TTTGTGGCAC [C/T] AGCTTGGAGC	N	C	T	Q	.
G181u5	WIAP-11705	HT48793		640 4	ERCC4, excision repair cross-complementing rodent repair deficiency, complementation group	TTCTATGACA [C/T] CTACCATGCT	M	C	T	P	S
G181u6	WIAP-11670	HT48793		1117 4	ERCC4, excision repair cross-complementing rodent repair deficiency, complementation group	AGAAAGCAAC [C/T] CAAAGTGGGA	M	C	T	P	S
G185u1	WIAP-11668	HT5122		319	ACVR2B, activin A receptor, type IIB	TCTGCAACGA [G/A] CGCTTCACTC	S	G	A	E	E
G185u2	WIAP-11707	HT5122		70	ACVR2B, activin A receptor, type IIB	AGACACGGGA [G/C] TGCATCTACT	M	G	C	E	D
G185u3	WIAP-11672	HT5122		812	ACVR2B, activin A receptor, type IIB	CCTCAGGAT [T/C] ACCTCAAGGG	M	T	C	Y	H
G185u4	WIAP-13542	X77533		1109	ACVR2B, activin A receptor, type IIB	GGCTCCTGAG [G/A] TGCTCGAGGG	M	G	A	V	M
G185u5	WIAP-13558	X77533		997	ACVR2B, activin A receptor, type IIB	TGCTGAAGAG [C/T] GACCTCACAG	S	C	T	S	S
G187u1	WIAP-11669	HT97400		183	androgen	CCAGAGACAG [C/T] GCGACCCGGA	M	C	T	R	C
G191u1	WIAP-10176	AF025375		414	CXCR4, chemokine (C-X-C motif), receptor 4 (fusin)	ACCTGGCCAT [C/T] GTCCACGCCA	S	C	T	I	I
G193u1	WIAP-10178	D29984		231	CCR2, chemokine (C-C motif) receptor 2	AGTGCTTGAC [T/A] GACATTTACC	S	T	A	T	T
G193u2	WIAP-10179	D29984		190	CCR2, chemokine (C-C motif) receptor 2	CATGCTGGTC [G/A] TCCTCATCTT	M	G	A	V	I
G194u1	WIAP-10211	D43767		121	SCYA17, small inducible cytokine subfamily A (Cys-Cys), member 17	ACATCCACGC [A/C] GCTCGAGGGA	S	A	C	A	A
G197u1	WIAP-10167	D50403		1515	NRAMP1, natural resistance-associated macrophage protein 1 (might include Leishmaniasis)	GGTGCTAGTC [T/C] GCGCCATCAA	M	T	C	C	R

G197u2	WIAP-10173	D50403			1629	NRAMP1, natural resistance-associated macrophage protein 1 (might include Leishmaniasis)	CACCTACCTG [G/C] TCTGACCTG	M	G	C	V	L
G20u1	WIAP-10249	U14722			896	ACVR1B, activin A receptor, type IB	CGGTACACAG [T/C] GACAATTGAG	M	T	C	V	A
G20u2	WIAP-10250	U14722			866	ACVR1B, activin A receptor, type IB	GAGCAGGGT [C/T] CTTGTTGAT	M	C	T	S	F
G20u3	WIAP-10251	U14722			1391	ACVR1B, activin A receptor, type IB	CAGAGTTATG [A/T] GGCACCTGGG	M	A	T	E	V
G20u4	WIAP-10252	U14722			1236	ACVR1B, activin A receptor, type IB	TATATTGGA [G/C] ATTGCTCGAA	M	G	C	E	D
G20u5	WIAP-10261	U14722			518	ACVR1B, activin A receptor, type IB	GAGATGTGTC [T/C] CTCCAAAGAC	M	T	C	L	P
G207a1	WIAP-10516	L25259			866	Human CTLA4 counter-receptor (B7-2) mRNA, complete cds.	AGCTGTACTT [C/T] CAACAGTTAT	M	C	T	P	S
G208u1	WIAP-10204	L31581			85	CCR7, chemokine (C-C motif) receptor 7	GGGGAACCA [A/G] TGAAGAAGCGT	M	A	G	M	V
G211u1	WIAP-10213	M24545			174	SCYA2, small inducible cytokine A2 (monocyte chemotactic protein 1, homologous to mouse Sig-je)	TCACCTGCTG [T/C] TATAACTTCA	S	T	C	C	C
G214u1	WIAP-10191	M27533			452	CD80, CD80 antigen (CD28 antigen ligand 1, B7-1 antigen)	TGAAGAAGT [G/A] GCAAGCGTGT	S	G	A	V	V
G215u1	WIAP-11659	M28393			822	PRF1, perforin 1 (preforming protein)	GCATCTCTGC [C/T] GAAGCCAAGG	S	C	T	A	A
G215u2	WIAP-11723	M28393			159	PRF1, perforin 1 (preforming protein)	TGACCAGCT [C/T] CGCCGCTCGG	S	C	T	L	L
G215u3	WIAP-11724	M28393			96	PRF1, perforin 1 (preforming protein)	CAGAGTGCA [G/A] CGCAGCCACA	S	G	A	K	K
G215u4	WIAP-11725	M28393			1377	PRF1, perforin 1 (preforming protein)	ATAACAACCC [C/T] ATCTGGTCAG	S	C	T	P	P
G215u5	WIAP-11726	M28393			1326	PRF1, perforin 1 (preforming protein)	TGAAGCTCTT [C/T] TTTGGTGCC	S	C	T	F	F

G215u6	WIAP-11727	M28393	1076	PRF1, perforin 1 (preforming protein)	CGCGGGAGG [C/T] ACTGAGGAGG	M	C	T	A	V
G217u1	WIAP-11691	M31932	649	FCGR2B, Fc fragment of IgG, low affinity IIB, receptor for (CD32)	GCAGCTCTTC [A/G] CCAATGGGA	S	A	G	S	S
G217u2	WIAP-11692	M31932	625	FCGR2B, Fc fragment of IgG, low affinity IIB, receptor for (CD32)	TCACTGTCCA [A/G] GTGCCAGCA	S	A	G	Q	Q
G217u3	WIAP-11712	M31932	332	FCGR2B, Fc fragment of IgG, low affinity IIB, receptor for (CD32)	GACTGGCCAG [A/C] CCAGCCTCAG	M	A	C	T	P
G217u4	WIAP-11713	M31932	101	FCGR2B, Fc fragment of IgG, low affinity IIB, receptor for (CD32)	GGCTTCTGCA [G/T] ACAGTCAAGC	M	G	T	D	Y
G218u1	WIAP-10184	M36712	677	CD8B1, CD8 antigen, beta polypeptide 1 (p37)	TTTTACAAAT [A/G] AGCAGAGAAT	N	A	G	*	*
G218u2	WIAP-10188	M36712	326	CD8B1, CD8 antigen, beta polypeptide 1 (p37)	GCTGTGTTTC [G/C] GGATGCAAGC	M	G	C	R	P
G218u3	WIAP-10189	M36712	196	CD8B1, CD8 antigen, beta polypeptide 1 (p37)	CAGTACATG [C/T] GCATCTACTG	M	C	T	R	C
G218u4	WIAP-10190	M36712	225	CD8B1, CD8 antigen, beta polypeptide 1 (p37)	AGGCCAGGC [A/C] CCGAGCAGTG	S	A	C	A	A
G218u5	WIAP-10194	M36712	583	CD8B1, CD8 antigen, beta polypeptide 1 (p37)	GGTGGCTGGC [G/A] TCCTGTTTCT	M	G	A	V	I
G218u6	WIAP-10208	M36712	372	CD8B1, CD8 antigen, beta polypeptide 1 (p37)	TGAGCCCGA [A/G] GACAGTGGCA	S	A	G	E	B
G218u7	WIAP-10209	M36712	400	CD8B1, CD8 antigen, beta polypeptide 1 (p37)	CTGCATGATC [G/T] TCGGAGGCC	M	G	T	V	F
G218u8	WIAP-10210	M36712	270	CD8B1, CD8 antigen, beta polypeptide 1 (p37)	TCTGGATTTC [C/T] GCNAAAGGGA	S	C	T	S	S
G218u9	WIAP-10518	M36712	618	CD8B1, CD8 antigen, beta polypeptide 1 (p37)	GAGTGGCCAT [C/G] CACCTGTGCT	M	C	G	I	M
G218a10	WIAP-13223	M36712	556	CD8B1, CD8 antigen, beta polypeptide 1 (p37)	TTGTAGCCCC [A/G] TCACCCCTTGG	M	A	G	I	V
G218a11	WIAP-13224	M36712	836	CD8B1, CD8 antigen, beta polypeptide 1 (p37)	CTGTGTGTGA [T/C] GTGCATGGGA	-	T	C	-	-
G22u1	WIAP-10301	U86136	6719	Human telomerase-associated protein TP-1 mRNA, complete cds.	GGTGTAACC [G/A] TCGGGCTAGA	M	G	A	V	I

G22u2	WIAP-10302	U86136	7537	Human telomerase-associated protein TP-1 mRNA, complete cds.	CTGATGGGAT [C/G] CTATGGAACC	M	C	G	I	M
G22u3	WIAP-10311	U86136	1798	Human telomerase-associated protein TP-1 mRNA, complete cds.	ATGATGCCAT [T/C] GATGCCCTCG	S	T	C	I	I
G22u4	WIAP-10312	U86136	2397	Human telomerase-associated protein TP-1 mRNA, complete cds.	CTGTCTCTGG [C/T] TGGCCAAAGG	M	C	T	A	V
G22u5	WIAP-10313	U86136	3289	Human telomerase-associated protein TP-1 mRNA, complete cds.	AGAAAGGGAT [A/C] ACCTGCCGCA	S	A	C	I	I
G22u6	WIAP-10314	U86136	3242	Human telomerase-associated protein TP-1 mRNA, complete cds.	AGAGGCCGCA [T/C] GTGGGATCTC	M	T	C	C	R
G22u7	WIAP-10315	U86136	4482	Human telomerase-associated protein TP-1 mRNA, complete cds.	CCGTTTGCTT [G/A] CCTCGTCCAG	M	G	A	C	Y
G22u8	WIAP-10316	U86136	4363	Human telomerase-associated protein TP-1 mRNA, complete cds.	GTTTGACTGT [G/A] GACCAGCTGC	S	G	A	V	V
G22u9	WIAP-10317	U86136	4230	Human telomerase-associated protein TP-1 mRNA, complete cds.	GTGTCTGAGA [G/A] ACTCCGGACC	M	G	A	R	K
G22u10	WIAP-10318	U86136	4419	Human telomerase-associated protein TP-1 mRNA, complete cds.	GGGACTAAGA [G/C] CTGGGAAGAA	M	G	C	S	T
G22u11	WIAP-10319	U86136	5269	Human telomerase-associated protein TP-1 mRNA, complete cds.	TCTCCGATGA [T/C] ACACTCTTTC	S	T	C	D	D
G22u12	WIAP-10320	U86136	5015	Human telomerase-associated protein TP-1 mRNA, complete cds.	GCTGCTCTCC [C/T] GGAGATGGCA	M	C	T	R	W
G22u13	WIAP-10321	U86136	5133	Human telomerase-associated protein TP-1 mRNA, complete cds.	GTGGCCTTCT [C/T] CACCAATGGG	M	C	T	S	F
G22u14	WIAP-10322	U86136	7764	Human telomerase-associated protein TP-1 mRNA, complete cds.	ACAGCCCTCC [A/G] TGTGCTACCT	M	A	G	H	R

G22u15	WIAF-10323	U86136	7884	Human telomerase-associated protein TP-1 mRNA, complete cds.	TGCCTGGAAC [C/T] TTGGCTGGGC	M	C	T	P	L
G22u16	WIAF-10324	U86136	7744	Human telomerase-associated protein TP-1 mRNA, complete cds.	AGATTCACTC [G/A] GGCTCTGTCA	S	G	A	S	S
G22u17	WIAF-10337	U86136	1018	Human telomerase-associated protein TP-1 mRNA, complete cds.	CCATTGCTGC [T/C] TTCTTGCCGG	S	T	C	A	A
G22u18	WIAF-10338	U86136	1000	Human telomerase-associated protein TP-1 mRNA, complete cds.	TGGCCATATA [C/A] ATCTTGGCCA	M	C	A	N	K
G22u19	WIAF-10339	U86136	1182	Human telomerase-associated protein TP-1 mRNA, complete cds.	ATGACGGACA [A/G] ATTTGCCCAG	M	A	G	K	R
G22u20	WIAF-10340	U86136	1939	Human telomerase-associated protein TP-1 mRNA, complete cds.	AGCAGCTTCG [T/G] ATGGCAATGA	S	T	G	R	R
G22u21	WIAF-10341	U86136	2227	Human telomerase-associated protein TP-1 mRNA, complete cds.	TCACGAGGGC [G/A] GAGCAGGTGG	S	G	A	A	A
G22u22	WIAF-10342	U86136	2776	Human telomerase-associated protein TP-1 mRNA, complete cds.	GGCGAGCAT [C/T] CGGCTTTTCA	S	C	T	I	I
G22u23	WIAF-10343	U86136	2877	Human telomerase-associated protein TP-1 mRNA, complete cds.	GCCCTCACC [G/A] TATCAGCCTT	M	G	A	R	H
G22u24	WIAF-10344	U86136	3087	Human telomerase-associated protein TP-1 mRNA, complete cds.	TCAGGGCGCT [C/T] TGTGACAGAG	M	C	T	S	F
G22u25	WIAF-10345	U86136	3662	Human telomerase-associated protein TP-1 mRNA, complete cds.	CAAGGTGGCA [C/T] CATTAGTCTT	M	C	T	P	S
G22u26	WIAF-10346	U86136	4762	Human telomerase-associated protein TP-1 mRNA, complete cds.	TTTCGAAGTT [C/T] CTTACCAACC	S	C	T	F	F
G22u27	WIAF-10351	U86136	1737	Human telomerase-associated protein TP-1 mRNA, complete cds.	CTCCAGCATG [G/C] GAAGTCGGTG	M	G	C	G	A

G22u28	WIAP-10352	U86136		3543	Human telomerase-associated protein TP-1 mRNA, complete cds.	ACAGTGAAC [A/G]GCTGATGCTG	M	A	G	Q	R
G22u29	WIAP-10353	U86136		4232	Human telomerase-associated protein TP-1 mRNA, complete cds.	GTCTGAGAGA [C/T]TCGGACCCT	M	C	T	L	F
G22u30	WIAP-10354	U86136		4523	Human telomerase-associated protein TP-1 mRNA, complete cds.	GGAGGCCCT [C/T]TGAGCGCCC	S	C	T	L	L
G22u31	WIAP-10355	U86136		5333	Human telomerase-associated protein TP-1 mRNA, complete cds.	TGCTTCTCGG [G/T]TGCTGCAGAC	M	G	T	V	L
G22u32	WIAP-10356	U86136		6208	Human telomerase-associated protein TP-1 mRNA, complete cds.	AGCTGCTGAC [G/A]CGGCCACACA	S	G	A	T	T
G22u33	WIAP-10357	U86136		7703	Human telomerase-associated protein TP-1 mRNA, complete cds.	TAGTGAGCCA [A/G]CACCACATCT	M	A	G	T	A
G22u34	WIAP-10360	U86136		3881	Human telomerase-associated protein TP-1 mRNA, complete cds.	CATCGATGGG [G/A]CTGATAGGTT	M	G	A	A	T
G22u1	WIAP-11700	M57230		697	IL6ST, interleukin 6 signal transducer (gpi30, oncostatin M receptor)	TGAGTGGGAT [G/C]CTGGAAGGA	M	G	C	G	R
G22u2	WIAP-11701	M57230		708	IL6ST, interleukin 6 signal transducer (gpi30, oncostatin M receptor)	GTGGAAGGA [A/G]ACACACTTGG	S	A	G	E	E
G22u3	WIAP-11702	M57230		677	IL6ST, interleukin 6 signal transducer (gpi30, oncostatin M receptor)	GAGGGGAAGA [A/G]AATGAGGTGT	M	A	G	K	R
G22u4	WIAP-11706	M57230		1616	IL6ST, interleukin 6 signal transducer (gpi30, oncostatin M receptor)	AAGAAATATA [T/C]ACTTGAGTGG	M	T	C	I	T
G22u5	WIAP-11667	M57230		1444	IL6ST, interleukin 6 signal transducer (gpi30, oncostatin M receptor)	TGATCGCTAT [C/G]TAGCAACCT	M	C	G	L	V
G22u6	WIAP-11708	M57230		981	IL6ST, interleukin 6 signal transducer (gpi30, oncostatin M receptor)	TCTTAATTT [G/C]ACATGGACCA	M	G	C	L	F



G226u1	WIAP-11714	M85079		869	TGFB2, transforming growth factor, beta receptor II (70-80kd)	CACTGGGAGT [T/C]GCCATATCTG	S	T	C	V	V
G226u2	WIAP-11715	M85079		1749	TGFB2, transforming growth factor, beta receptor II (70-80kd)	AGATTATGAG [C/T]CTCCATTGG	M	C	T	P	S
G226u3	WIAP-11716	M85079		1601	TGFB2, transforming growth factor, beta receptor II (70-80kd)	TGGAACTGC [A/G]AGATACATGG	S	A	G	A	A
G226u4	WIAP-11721	M85079		1256	TGFB2, transforming growth factor, beta receptor II (70-80kd)	TACTCCAGTT [C/G]CTGACGGCTG	M	C	G	F	L
G226u5	WIAP-11722	M85079		1502	TGFB2, transforming growth factor, beta receptor II (70-80kd)	TCGTGAAGAA [C/T]GACCTAACCT	S	C	T	N	N
G226u6	WIAP-11671	M85079		888	TGFB2, transforming growth factor, beta receptor II (70-80kd)	TGTCATCATC [A/C]TCTTCTACTG	M	A	C	I	L
G226u7	WIAP-11674	M85079		1425	TGFB2, transforming growth factor, beta receptor II (70-80kd)	CCTCCACAGT [G/A]ATCACACTCC	M	G	A	D	N
G227u1	WIAP-10197	M86511		685	CD14, CD14 antigen	CCTGCTGAC [A/G]ATCCTGGACT	M	A	G	N	D
G227u2	WIAP-10212	M86511		497	CD14, CD14 antigen	GAAGCCACAG [G/A]ACTTGCACCT	M	G	A	G	E
G2278u1	WIAP-14117	AF034611		959	CUBN, cubilin (intrinsic factor-cobalamin receptor)	AGATAAATAA [T/C]GGCGGCTGTT	S	T	C	N	N
G2278u2	WIAP-14118	AF034611		781	CUBN, cubilin (intrinsic factor-cobalamin receptor)	GGTGGATGT [C/T]TTCACCCAC	M	C	T	S	F
G2278u3	WIAP-14119	AF034611		641	CUBN, cubilin (intrinsic factor-cobalamin receptor)	CTGAGACGTA [C/T]GGACCCCACT	S	C	T	Y	Y
G2278u4	WIAP-14121	AF034611		1185	CUBN, cubilin (intrinsic factor-cobalamin receptor)	TGGTTATGGG [C/A]CAAATGGATG	M	C	A	P	T
G2278u5	WIAP-14133	AF034611		1532	CUBN, cubilin (intrinsic factor-cobalamin receptor)	TCTGGTTAT [C/G]AAAACGTAAA	M	C	G	I	M
G2278u6	WIAP-14134	AF034611		2208	CUBN, cubilin (intrinsic factor-cobalamin receptor)	GCCTTTCAC [C/T]ACACCAGGCA	M	C	T	H	Y
G228u1	WIAP-10199	U00672		586	IL10RA, interleukin 10 receptor, alpha	GCAAGGTGCC [G/A]GGAAACTTCA	S	G	A	P	P
G228u2	WIAP-10200	U00672		731	IL10RA, interleukin 10 receptor, alpha	AGAGGAGTGC [A/G]TCTCCCTCAC	M	A	G	I	V

G2280u1	WIAF-13970	AJ001515	1747	RVR3, ryanodine receptor 3	CAGGTATCTT[G/A]GAAGTTTGC	S	G	A	L	L
G2280u2	WIAF-13974	AJ001515	8593	RVR3, ryanodine receptor 3	TAGAAGCCAT[T/C]GTCAGCAATG	S	T	C	I	I
G2282u1	WIAF-12694	D00726	263	FECH, ferrochelatase (protoporphyrin)	ACATGGGAGG[C/T]CCTGAACTC	S	C	T	G	G
G2282u2	WIAF-12695	D00726	514	FECH, ferrochelatase (protoporphyrin)	TACTATATTG[G/A]ATTTCGGTAC	M	G	A	G	E
G2285u1	WIAF-12688	D16611	673	CPO, coproporphyrinogen oxidase (coproporphyrin, harderoporphyrin)	AGNAGAGCCT[G/A]TCCATTTTCA	M	G	A	V	I
G2285u2	WIAF-12689	D16611	783	CPO, coproporphyrinogen oxidase (coproporphyrin, harderoporphyrin)	ATCCTGGAGA[G/A]CGCGGGGCA	S	G	A	E	E
G2287u1	WIAF-12687	D28472	502	PTGER4, prostaglandin E receptor 4 (subtype EP4)	GGCCCTCAGC[C/T]TCTTTGCACT	M	C	T	L	F
G2287u2	WIAF-12691	D28472	1309	PTGER4, prostaglandin E receptor 4 (subtype EP4)	TGAAAATGGC[C/T]TTGGAGGCGAG	M	C	T	L	F
G2287u3	WIAF-12707	D28472	243	PTGER4, prostaglandin E receptor 4 (subtype EP4)	AGGAGAGGAC[C/T]TTCTACAGC	S	C	T	T	T
G2287u4	WIAF-12710	D28472	1343	PTGER4, prostaglandin E receptor 4 (subtype EP4)	GGTGTGCTCG[G/A]CATGGGCTTG	M	G	A	G	D
G229u1	WIAF-10185	U16752	202	SDF1, stromal cell-derived factor 1	CATGTTGCCA[G/A]AGCCAACTGC	M	G	A	R	K
G2295u1	WIAF-12727	D89079	613	LTB4R, leukotriene b4 receptor (chemokine receptor-like 1)	CTATGTCTGC[G/C]GAGTCAGCAT	M	G	C	G	R
G2295u2	WIAF-12728	D89079	1248	LTB4R, leukotriene b4 receptor (chemokine receptor-like 1)	AGGGCAGGG[T/C]TCCGAGGCGT	S	T	C	G	G
G2295u3	WIAF-12753	D89079	1348	LTB4R, leukotriene b4 receptor (chemokine receptor-like 1)	CCTCACTGCC[T/G]CCAGCCCTCT	M	T	G	S	A
G230u1	WIAF-10201	U31628	627	IL15RA, interleukin 15 receptor, alpha	ACAGCCAAGA[A/C]CTGGGAAGCTC	M	A	C	N	T
G2300u1	WIAF-12735	J02959	102	LTA4H, leukotriene A4 hydrolase	ACCTGCACCT[G/T]CGCTGAGCG	S	G	T	L	L
G2300u2	WIAF-12738	J02959	1380	LTA4H, leukotriene A4 hydrolase	CCTGGCTCTA[C/T]TCTCTGGAC	S	C	T	Y	Y

G2302u1	WIAP-12741	J03037	627	CA2, carbonic anhydrase II	TCCTGAATCC [C/T] TGGATTACTG	S	C	T	L	L
G2302u2	WIAP-12742	J03037	819	CA2, carbonic anhydrase II	GCCACTGAAG [A/G] ACAGGCAAT	M	A	G	N	D
G2303u1	WIAP-12751	J03571	304	ALOX5, arachidonate 5-lipoxygenase	CGCTGAAGAC [G/A] CCCCAAGGG	S	G	A	T	T
G2303u2	WIAP-12752	J03571	794	ALOX5, arachidonate 5-lipoxygenase	AGAGCTGCC [G/A] AGAAGCTCCC	M	G	A	E	K
G2304u1	WIAP-12772	J03575	840	PDHA1, pyruvate dehydrogenase (lipoamide) alpha 1	TCCGAGAGGC [A/G] ACNAGGTTTG	S	A	G	A	A
G2304u2	WIAP-12779	J03575	1044	PDHA1, pyruvate dehydrogenase (lipoamide) alpha 1	CCAGTGTGGA [A/C] GAACCTAAGG	M	A	C	E	D
G2305u1	WIAP-12763	J03576	456	PDHB, pyruvate dehydrogenase (lipoamide) beta	TCTTCAGGGG [A/G] CCCAATGGTG	S	A	G	G	G
G2305u2	WIAP-12764	J03576	650	PDHB, pyruvate dehydrogenase (lipoamide) beta	GTTCCTTTTG [A/C] ATTTCCTCCG	M	A	C	E	A
G231u1	WIAP-10202	U32324	734	IL1RA, interleukin 11 receptor, alpha	CCAGGGCCTG [C/T] GGGTAGAGTC	M	C	T	R	W
G2312u1	WIAP-12762	J05096	3726	ATPIA2, ATPase, Na+/K+ transporting, alpha 2 (+) polypeptide	TCAAGAACCA [C/T] ACAGAGATCG	S	C	T	H	H
G2313u1	WIAP-12760	J05200	6141	RYR1, ryanodine receptor 1 (skeletal)	TGCAATTCAA [A/G] GATGTACAG	S	A	G	K	K
G2313u2	WIAP-12767	J05200	3048	RYR1, ryanodine receptor 1 (skeletal)	CGGCCGAGAC [A/G] ACACCTGGTGG	S	A	G	T	T
G2313u3	WIAP-12768	J05200	3084	RYR1, ryanodine receptor 1 (skeletal)	ATGGGCACAA [C/T] GTGTGGGCCC	S	C	T	N	N
G2313u4	WIAP-12777	J05200	5667	RYR1, ryanodine receptor 1 (skeletal)	GCACTTTTGG [C/T] GATGAGGATG	S	C	T	G	G
G2313u5	WIAP-12780	J05200	6600	RYR1, ryanodine receptor 1 (skeletal)	GCTCGTGTG [C/T] ATCGTGCAGA	S	C	T	L	L
G2313u6	WIAP-12781	J05200	7191	RYR1, ryanodine receptor 1 (skeletal)	AGCCTGAGTG [C/T] TTCGGACCCG	S	C	T	C	C
G2313u7	WIAP-12782	J05200	7602	RYR1, ryanodine receptor 1 (skeletal)	ACCACNAGGC [G/A] TCCATGGTGC	S	G	A	A	A

G2313u8	WIAF-12784	J05200	9288	RYR1, ryanodine receptor 1 (skeletal)	CAGACGCCCC [A/G]CCTGTGGTCA	S	A	G	P	P
G2313u9	WIAF-12786	J05200	13690	RYR1, ryanodine receptor 1 (skeletal)	TCCAAAGAAG [G/A]AGGAAGCTGG	M	G	A	E	K
G2313u10	WIAF-12789	J05200	3147	RYR1, ryanodine receptor 1 (skeletal)	ACATCCACG [G/A]CGCCGAACCC	S	G	A	A	A
G2314u1	WIAF-12771	J05272	1920	IMPDH1, IMP (inosine monophosphate) dehydrogenase 1	TGAAGATCGC [A/G]CAGGGTGTCT	S	A	G	A	A
G2319u1	WIAF-12814	K03191	651	CYP1A1, cytochrome P450, subfamily I (aromatic compound-inducible), polypeptide 1	CCCCACAGG [T/C]ATGTGGTGGT	M	T	C	Y	H
G232u1	WIAF-11657	U58917	1490	Homo sapiens IL-17 receptor mRNA, complete cds.	TGRACATGAT [C/T]CTCCCGGACT	S	C	T	I	I
G232u2	WIAF-11677	U58917	1293	Homo sapiens IL-17 receptor mRNA, complete cds.	GCAGGCCATC [T/C]CGGAGGCAGG	M	T	C	S	P
G232u3	WIAF-11658	U58917	1132	Homo sapiens IL-17 receptor mRNA, complete cds.	GGCTGCTG [C/T]GGCTGACCTG	M	C	T	A	V
G232u4	WIAF-11679	U58917	905	Homo sapiens IL-17 receptor mRNA, complete cds.	GCAGCTGCCT [C/T]AATGACTGCC	S	C	T	L	L
G232u5	WIAF-11682	U58917	1794	Homo sapiens IL-17 receptor mRNA, complete cds.	GTTCGAATGT [G/T]AGAACCTCTA	N	G	T	E	A
G232u7	WIAF-11660	U58917	743	Homo sapiens IL-17 receptor mRNA, complete cds.	TGACCAATTT [T/C]CCGCACATGG	S	T	C	P	P
G2322u1	WIAF-12853	L01406	1316	GHRHR, growth hormone releasing hormone receptor	CTGACATCTA [T/C]GTGCTAGGCT	M	T	C	M	T
G2328u1	WIAF-12845	L20316	1285	GCGR, glucagon receptor	TGCGGGCACG [G/C]CAGATGCACC	S	G	C	R	R
G2329u1	WIAF-12850	L22214	713	ADORA1, adenosine A1 receptor	TGCTGGCAAT [T/C]GCTGTGGACC	S	T	C	I	I
G2329u2	WIAF-12851	L22214	716	ADORA1, adenosine A1 receptor	TGCAATTC [T/G]GTGGACCGCT	S	T	G	A	A

G2335a1	WIAP-12136	L32961	265	ABAT, 4-aminobutyrate aminotransferase	CCTAGATCTC [A/G] GGAGTTAATG	M	A	G	Q	R
G2335a2	WIAP-12137	L32961	407	ABAT, 4-aminobutyrate aminotransferase	TCTCTCTGT [T/C] CCCATAGGTT	S	T	C	V	V
G2335u3	WIAP-12838	L32961	365	ABAT, 4-aminobutyrate aminotransferase	TTGATGTGGA [C/T] GGCAACCGAA	S	C	T	D	D
G2335u4	WIAP-12839	L32961	583	ABAT, 4-aminobutyrate aminotransferase	ATCACCATGG [C/T] CTGGGGCTCC	M	C	T	A	V
G2335u5	WIAP-12841	L32961	1082	ABAT, 4-aminobutyrate aminotransferase	TGGACGAGGT [C/A] CAGACCGGAG	S	C	A	V	V
G2335u6	WIAP-12852	L32961	227	ABAT, 4-aminobutyrate aminotransferase	ATTATGATGG [G/A] CCTCTGATGA	S	G	A	G	G
G2337u1	WIAP-13577	L34820	149	ALDH5A1, aldehyde dehydrogenase 5 family, member A1 (succinate-semialdehyde dehydrogenase)	TGTTCTCGAA [A/G] GAATGCCAAG	M	A	G	K	R
G2342a1	WIAP-12138	M12530	1602	TF, transferrin	GCCTAAACCT [G/C] TGTGAACCCA	S	G	C	L	L
G2342a2	WIAP-12139	M12530	1795	TF, transferrin	TACCAGGAAA [C/T] CTGTGGAGGA	M	C	T	P	S
G2346u1	WIAP-12829	M13928	234	ALAD, aminolevulinate, delta-, dehydratase	TGGCCAGGTA [T/C] GGTGTGAAGC	S	T	C	Y	Y
G2346u2	WIAP-12830	M13928	529	ALAD, aminolevulinate, delta-, dehydratase	TGAGGTGGCA [T/C] TGGCGTATGC	S	T	C	L	L
G2346u3	WIAP-12843	M13928	480	ALAD, aminolevulinate, delta-, dehydratase	TGAGTGAATA [C/T] GGAGCATTC	S	C	T	N	N
G2348u1	WIAP-12835	M14016	621	UROD, uroporphyrinogen decarboxylase	CTCTGGTCCC [A/G] TATCTGTAG	S	A	G	P	P
G235u1	WIAP-11678	UB3171	100	SCYA22, small inducible cytokine subfamily A (Cys-Cys), member 22	CAGGCCCTTA [C/T] GCGGCCAACA	S	C	T	Y	Y
G2363a1	WIAP-10519	M37435	596	CSF1, colony stimulating factor 1 (macrophage)	GACAAGGACT [G/T] GAATATTTTC	M	G	T	M	L
G2363a2	WIAP-13225	M37435	498	CSF1, colony stimulating factor 1 (macrophage)	AAGAGCATGA [C/T] AAGGCTGCG	S	C	T	D	D
G2363a3	WIAP-13226	M37435	712	CSF1, colony stimulating factor 1 (macrophage)	CAGTGACCCG [G/T] CCTCTGTCTC	M	G	T	A	S

G2369u1	WIAP-12854	M30773	857	PPP3R1, protein phosphatase 3 (formerly 2B), regulatory subunit B (19kD), alpha isoform (calcineurin B, type I)	TTGATTGGGA (C/T) AATTCTGGTT	S	C	T	D	D
G2369u2	WIAP-12855	M30773	1274	PPP3R1, protein phosphatase 3 (formerly 2B), regulatory subunit B (19kD), alpha isoform (calcineurin B, type I)	ATCTGTGACT (C/T) TTATCAGAGA	-	C	T	-	-
G237u1	WIAP-11662	U86358	311	SCYA25, small inducible cytokine subfamily A (Cys-Cys), member 25	CACCACAACA (T/C) GCAGACCTTC	M	T	C	M	T
G237u2	WIAP-11680	U86358	134	SCYA25, small inducible cytokine subfamily A (Cys-Cys), member 25	GTGCTCCGGC (G/A) CGCCTGGACT	M	G	A	R	H
G237u3	WIAP-11681	U86358	133	SCYA25, small inducible cytokine subfamily A (Cys-Cys), member 25	TGTGCTCCGG (C/T) GCGCCTGGAC	M	C	T	R	C
G237u5	WIAP-11661	U86358	302	SCYA25, small inducible cytokine subfamily A (Cys-Cys), member 25	GCAAAGCTCC (A/G) CCAACACATG	M	A	G	H	R
G237u6	WIAP-11663	U86358	378	SCYA25, small inducible cytokine subfamily A (Cys-Cys), member 25	AGTTATCATC (A/G) TCCAAGTTTA	S	A	G	S	S
G2373u1	WIAP-12870	M36035	500	B2RP, benzodiazepine receptor (peripheral)	GCTGGCCTTC (G/A) CGACCACACT	M	G	A	A	T
G2376u1	WIAP-13025	M57414	979	TACR2, tachykinin receptor 2	CTGCTGCCCA (T/C) GGGTCACACC	M	T	C	W	R
G238u1	WIAP-10177	X01394	239	TNF, tumor necrosis factor (TNF superfamily, member 2)	GCTCCAGGCG (G/T) TGTCTGTCC	S	G	T	R	R
G2381u1	WIAP-12894	M59941	730	CSF2RB, colony stimulating factor 2 receptor, beta, low-affinity (granulocyte-macrophage)	CAGAGGTTTG (C/T) TGGGACTCCC	S	C	T	C	C

G2381u2	WIAF-12896	M59941			1306	CSP2RB, colony stimulating factor 2 receptor, beta, low-affinity (granulocyte-macrophage)	GGATCTGGAG [C/T] GACTGGAGTG	S	C	T	S	S
G2381u3	WIAF-12900	M59941			1972	CSP2RB, colony stimulating factor 2 receptor, beta, low-affinity (granulocyte-macrophage)	CGATGGGACC [G/A] GGACAGGCCG	S	G	A	P	P
G2381u4	WIAF-12901	M59941			1982	CSP2RB, colony stimulating factor 2 receptor, beta, low-affinity (granulocyte-macrophage)	GGGACAGGCC [G/A] TGAAGTGA	M	G	A	V	M
G2381u5	WIAF-12942	M59941			773	CSP2RB, colony stimulating factor 2 receptor, beta, low-affinity (granulocyte-macrophage)	CCAGAACCTG [G/C] AGTGCTTCTT	M	G	C	E	Q
G2381u6	WIAF-12946	M59941			2458	CSP2RB, colony stimulating factor 2 receptor, beta, low-affinity (granulocyte-macrophage)	CCCCACAGCC [C/A] GAGGGCCTCC	S	C	A	P	P
G2384u1	WIAF-12908	M61831			1000	AHCY, S-adenosylhomocysteine hydrolase	GCCCTGGAGA [A/C] GGTGAACATC	M	A	C	K	T
G2387u1	WIAF-12910	M63967			2585	ALDH5, aldehyde dehydrogenase 5	CTGCTGAACC [T/G] CCTGGCAGAC	M	T	G	L	R
G2387u2	WIAF-12911	M63967			2996	ALDH5, aldehyde dehydrogenase 5	TATGGCCCAA [C/G] AGCAGGTGCG	M	C	G	T	R
G2387u3	WIAF-12954	M63967			2522	ALDH5, aldehyde dehydrogenase 5	GCCCGGGAAG [C/T] CTTCCGCTCG	M	C	T	A	V
G2387u4	WIAF-12955	M63967			2448	ALDH5, aldehyde dehydrogenase 5	ACCTTACCAC [C/T] GGGAGGTCA	S	C	T	T	T
G2387u5	WIAF-12956	M63967			2460	ALDH5, aldehyde dehydrogenase 5	GGGAGGTGAT [C/T] GGGCAGCTGG	S	C	T	I	I

G2387u6	WIAP-12957	M63967	2991 ALDH5, aldehyde dehydrogenase 5	CGGGGTATGG (C/T) CCAACAGCAG	S	C	T	G	G
G2387u7	WIAP-12958	M63967	3022 ALDH5, aldehyde dehydrogenase 5	CGCCCGACAC (A/G) TGGATGTTGA	M	A	G	M	V
G2387u8	WIAP-12959	M63967	2943 ALDH5, aldehyde dehydrogenase 5	CCCTCATCAA (G/C) GAGGAGGCT	M	G	C	K	N
G2388u1	WIAP-12888	M64590	GLDC, glycine dehydrogenase (decarboxylating; glycine decarboxylase, glycine cleavage system protein P)	TGCCACAGAC (G/A) ATTTTGGGA	S	G	A	T	T
G2388u2	WIAP-12889	M64590	GLDC, glycine dehydrogenase (decarboxylating; glycine decarboxylase, glycine cleavage system protein P)	ACCAGCCTGA (G/A) GTGTCTCAGG	S	G	A	E	E
G2388u3	WIAP-12890	M64590	GLDC, glycine dehydrogenase (decarboxylating; glycine decarboxylase, glycine cleavage system protein P)	CAGACCATGG (T/C) GTGTGACATC	M	T	C	V	A
G2388u4	WIAP-12891	M64590	GLDC, glycine dehydrogenase (decarboxylating; glycine decarboxylase, glycine cleavage system protein P)	TATATTGGCA (T/C) GGGCTATTAT	M	T	C	M	T
G2388u5	WIAP-12938	M64590	GLDC, glycine dehydrogenase (decarboxylating; glycine decarboxylase, glycine cleavage system protein P)	GTGCCACAGA (C/G) GATTTTGGG	M	C	G	T	R
G2388u6	WIAP-12939	M64590	GLDC, glycine dehydrogenase (decarboxylating; glycine decarboxylase, glycine cleavage system protein P)	CTGCATGCCA (T/C) TTCAAGCAAA	M	T	C	I	T



G2388u7	WIAP-12940	M64590		810	GLDC, glycine dehydrogenase (decarboxylating; glycine decarboxylase, glycine cleavage system protein P)	GGAATTCT [C/T] GTTGATCCCC	S	C	T	L	L
G2388u8	WIAP-12941	M64590		1481	GLDC, glycine dehydrogenase (decarboxylating; glycine decarboxylase, glycine cleavage system protein P)	CATTGTGGCT [G/A] CTCAGTGAAG	M	G	A	C	Y
G2388u9	WIAP-12947	M64590		1841	GLDC, glycine dehydrogenase (decarboxylating; glycine decarboxylase, glycine cleavage system protein P)	AACTGAACA [G/A] TTCGTCGAA	M	G	A	S	N
G2388u10	WIAP-12948	M64590		2325	GLDC, glycine dehydrogenase (decarboxylating; glycine decarboxylase, glycine cleavage system protein P)	GACAGTCTA [C/T] CTAGACGGG	S	C	T	Y	Y
G2388u11	WIAP-12949	M64590		2362	GLDC, glycine dehydrogenase (decarboxylating; glycine decarboxylase, glycine cleavage system protein P)	GGTGGGAATC [T/A] GTCGCCCTGG	M	T	A	C	S
G2388u12	WIAP-12950	M64590		3220	GLDC, glycine dehydrogenase (decarboxylating; glycine decarboxylase, glycine cleavage system protein P)	TTAGTCCTCT [C/G] TCCCTAAGTT	-	C	G	-	-
G2391u1	WIAP-12998	M69238		623	ARNT, aryl hydrocarbon receptor nuclear translocator	TGGTGATATGT [G/C] TCTGACTCCG	S	G	C	V	V
G2391u2	WIAP-13002	M69238		1072	ARNT, aryl hydrocarbon receptor nuclear translocator	TGCCTAGTGG [C/T] CATTGGCAGA	M	C	T	A	V
G2391u3	WIAP-13021	M69238		966	ARNT, aryl hydrocarbon receptor nuclear translocator	ACCTCAGTTC [G/A] TGGTGGTCCA	M	G	A	V	M

G2394u1	WIAF-13003	M73747	2061	TSHR, thyroid stimulating hormone receptor	TTGCTGGTAC [T/A] CTCTATCCA	M	T	A	L	H
G2394u2	WIAF-13004	M73747	2248	TSHR, thyroid stimulating hormone receptor	TTACCCACGA [C/G] ATGAGGCAGG	M	C	G	D	S
G2396u1	WIAF-12995	M74542	1027	ALDH3, aldehyde dehydrogenase 3	CCCCCAGTCC [C/G] CGGTGATGCA	M	C	G	P	A
G2396u2	WIAF-13019	M74542	1295	ALDH3, aldehyde dehydrogenase 3	GGCAAGAAGA [G/A] CTTCGAGACT	M	G	A	S	N
G2403u1	WIAF-13583	M83670	280	CA4, carbonic anhydrase IV	TACGATAAGA [A/T] GCAAAAGCTGG	M	A	T	K	M
G2409u1	WIAF-10010	HT2156	1268	AGTR1, angiotensin receptor 1	CCACTCAAAAC [C/T] TTTCACAAA	M	C	T	L	P
G2411u1	WIAF-13541	M97759	210	ADORA2B, adenosine A2b receptor	TGGCGGGCAA [C/T] GTGCTGGTGT	S	C	T	N	N
G2422u1	WIAF-14077	S90469	375	POR, P450 (cytochrome) oxidoreductase	GCAGCCTGCC [A/G] GAGATCGACA	S	A	G	P	P
G2422u2	WIAF-14078	S90469	852	POR, P450 (cytochrome) oxidoreductase	TCTGGCTGC [A/G] GTCACACCCA	S	A	G	A	A
G2422u3	WIAF-14082	S90469	1496	POR, P450 (cytochrome) oxidoreductase	AAGGAGCCTG [T/C] CGGGGAGAAC	M	T	C	V	A
G2422u4	WIAF-14099	S90469	1443	POR, P450 (cytochrome) oxidoreductase	AGACCAAGGC [C/T] GGCCGCATCA	S	C	T	A	A
G2422u5	WIAF-14100	S90469	1704	POR, P450 (cytochrome) oxidoreductase	GCCGCCGCTC [G/A] GATGAGGACT	S	G	A	S	S
G2427u1	WIAF-14079	U07919	1369	ALDH6, aldehyde dehydrogenase 6	ACTATGGACT [C/T] ACAGCAGCCG	S	C	T	L	L
G2427u2	WIAF-14096	U07919	1347	ALDH6, aldehyde dehydrogenase 6	ATAAAAAGAG [C/T] GAATAGCACC	M	C	T	A	V
G243u1	WIAF-11684	X57522	926	TAP1, transporter 1, ABC (ATP binding cassette)	ATAGCCAGTG [C/G] AGTGTGGAG	M	C	G	A	G
G243u2	WIAF-11685	X57522	627	TAP1, transporter 1, ABC (ATP binding cassette)	ACCTACCCG [C/T] TTGCTTGCTCA	S	C	T	A	A
G243u3	WIAF-11686	X57522	538	TAP1, transporter 1, ABC (ATP binding cassette)	CCTGCCGGGA [C/G] TTGCCTTGTT	M	C	G	L	V
G243u4	WIAF-11687	X57522	798	TAP1, transporter 1, ABC (ATP binding cassette)	TGGTGGTCCT [C/G] TCCTCTCTTG	S	C	G	L	L
G243u5	WIAF-11689	X57522	1465	TAP1, transporter 1, ABC (ATP binding cassette)	TAGTATTTCA [G/T] GTATGCTGCT	M	G	T	G	C

G243u6	WIAF-11690	X57522	177	TAP1, transporter 1, ABC (ATP binding cassette)	AGAGTCCAG [A/G] CCGGCGGG	S	A	G	R	R
G243u7	WIAF-11693	X57522	1067	TAP1, transporter 1, ABC (ATP binding cassette)	AACATCATGT [C/T] TCGGTAACA	M	C	T	S	F
G243u8	WIAF-11665	X57522	1207	TAP1, transporter 1, ABC (ATP binding cassette)	GGTCACCGTG [A/G] TCACCCGCC	M	A	G	I	V
G243u9	WIAF-11664	X57522	1757	TAP1, transporter 1, ABC (ATP binding cassette)	CCAAACGCC [C/T] AGATGCTTA	M	C	T	P	L
G244u1	WIAF-10174	X60592	239	TNFRSF5, tumor necrosis factor receptor superfamily, member 5	CTTGGGTGA [A/G] AGCGAATCC	S	A	G	E	E
G244u1	WIAF-13682	U30246	1355	SLC12A2, solute carrier family 12 (sodium/potassium/chloride transporters), member 2	TGCTTAAGGA [A/G] CATTCATAC	S	A	G	E	E
G244u2	WIAF-13714	U30246	2691	SLC12A2, solute carrier family 12 (sodium/potassium/chloride transporters), member 2	AGCCAAATAT [C/G] AGCGATGCT	M	C	G	Q	E
G2443u1	WIAF-14004	U37143	1456	CYP2J2, cytochrome P450, subfamily IIJ (arachidonic acid epoxidase) polypeptide 2	CTGAAGTTTA [G/A] AATGGGTATC	M	G	A	R	K
G2443u2	WIAF-14032	U37143	376	CYP2J2, cytochrome P450, subfamily IIJ (arachidonic acid epoxidase) polypeptide 2	TTTAAGAAA [A/G] TGGATTGATT	M	A	G	N	S
G2443u3	WIAF-14033	U37143	1502	CYP2J2, cytochrome P450, subfamily IIJ (arachidonic acid epoxidase) polypeptide 2	TCTGGGTGT [T/A] CCTCAGGTGT	S	T	A	V	V
G2444u1	WIAF-14065	U37519	771	ALDH3, aldehyde dehydrogenase 3	CCCGCAGGA [A/G] TTGGGTGTG	M	A	G	N	S
G2444u2	WIAF-14066	U37519	1698	ALDH3, aldehyde dehydrogenase 3	AAGAGATCC [G/A] CTACCCACCC	M	G	A	R	H
G2445u1	WIAF-14114	U38178	236	CNP, 2',3'-cyclic nucleotide 3' phosphodiesterase	TGCCGGGCGC [G/A] CCTCTCGCTG	M	G	A	R	H

G2445u2	WIAF-14115	U38178		849	CNP, 2',3'-cyclic nucleotide 3' phosphodiesterase	GTGCCGCCA [A/G]GAAAAAGTGC	S	A	G	E	E
G2445u3	WIAF-14122	U38178		1655	CNP, 2',3'-cyclic nucleotide 3' phosphodiesterase	GTTATCTTGC [A/T]GAGATCTCTG	M	A	T	Q	L
G2445u4	WIAF-14241	X95520		941	CNP, 2',3'-cyclic nucleotide 3' phosphodiesterase	TGCAAAATAT [T/C]CAGGAGCCG	?	T	C	?	?
G2445u5	WIAF-14242	X95520		1057	CNP, 2',3'-cyclic nucleotide 3' phosphodiesterase	TGGAGTTGAT [C/T]TTTCAGTGCT	?	C	T	?	?
G2445u6	WIAF-14243	X95520		1583	CNP, 2',3'-cyclic nucleotide 3' phosphodiesterase	TCTACTGGCT [C/G]TCTAACTAAT	?	C	G	?	?
G2448u1	WIAF-13973	U46689		1895	ALDH10, aldehyde dehydrogenase 10 (fatty aldehyde dehydrogenase)	TTGTCARGGC [A/T]GAATATTACT	S	A	T	A	A
G2457u1	WIAF-13898	U90277		1304	GRIN2A, glutamate receptor, ionotropic, N-methyl D-aspartate 2A	GGTCCCGATG [C/T]ACACCTTGCA	M	C	T	H	Y
G2457u2	WIAF-13899	U90277		1934	GRIN2A, glutamate receptor, ionotropic, N-methyl D-aspartate 2A	AAGAAGTAAT [G/T]GCACGCTCTC	M	G	T	G	C
G2457u3	WIAF-13900	U90277		2230	GRIN2A, glutamate receptor, ionotropic, N-methyl D-aspartate 2A	TCGCTGTGAT [A/G]TTCTGGGCTA	M	A	G	I	M
G2457u4	WIAF-13902	U90277		2916	GRIN2A, glutamate receptor, ionotropic, N-methyl D-aspartate 2A	GGCATCTACA [G/A]CTGCATTTCAT	M	G	A	S	N
G2457u5	WIAF-13903	U90277		3251	GRIN2A, glutamate receptor, ionotropic, N-methyl D-aspartate 2A	CTATGTATTTC [C/T]AGGGACAACA	N	C	T	Q	*
G2457u6	WIAF-13917	U90277		2756	GRIN2A, glutamate receptor, ionotropic, N-methyl D-aspartate 2A	GGACATTGAC [A/G]ACATGGCGGG	M	A	G	N	D
G2468u1	WIAF-13642	X04011		1017	CYBB, cytochrome b-245, beta polypeptide (chronic granulomatous disease)	AGGTGTCCAA [G/A]CTGAGTGGC	S	G	A	K	K

G2473u1	WIAF-13670	X06990		ICAM1, intercellular adhesion molecule 1 (CD54), human rhinovirus receptor	1417				GTCACCCCG [G/A] AGGTGACCGT	M	G	A	E	K
G2473u2	WIAF-13695	X06990		ICAM1, intercellular adhesion molecule 1 (CD54), human rhinovirus receptor	179				GACCAGCCCA [A/T] GTTGTGGGC	M	A	T	K	M
G2480u1	WIAF-14148	X55330		AGA, aspartylglucosaminidase	800				TTGGCATGGT [T/G] GTAATCCATA	S	T	G	V	V
G2480u2	WIAF-14149	X55330		AGA, aspartylglucosaminidase	852				AAATGGTATA [A/T] AATTCAAAAT	N	A	T	K	*
G2480u3	WIAF-14158	X55330		AGA, aspartylglucosaminidase	616				TTATCTACCA [G/C] TGCTTCTCRA	M	G	C	S	T
G2485u1	WIAF-13612	X59543		RRM1, ribonucleotide reductase M1 polypeptide	2301				ATTGATCAAA [G/A] CCAATCTTTG	M	G	A	S	N
G2485u2	WIAF-13613	X59543		RRM1, ribonucleotide reductase M1 polypeptide	2410				ATTTAAGGAC [G/A] AGACCAGCAG	S	G	A	T	T
G2485u3	WIAF-13651	X59543		RRM1, ribonucleotide reductase M1 polypeptide	548				CAAGTCAACA [T/C] TGGATATTGT	S	T	C	L	L
G2485u4	WIAF-13652	X59543		RRM1, ribonucleotide reductase M1 polypeptide	199				TGCATGTGAT [C/T] AACCGAGATG	S	C	T	I	I
G2485u5	WIAF-13653	X59543		RRM1, ribonucleotide reductase M1 polypeptide	1037				CAACACAGCT [C/A] GATATGTGGA	S	C	A	R	R
G2485u6	WIAF-13660	X59543		RRM1, ribonucleotide reductase M1 polypeptide	1955				GAAGATTGCA [A/C] AGTATGGTAT	M	A	C	K	Q
G2485u7	WIAF-13877	X59543		RRM1, ribonucleotide reductase M1 polypeptide	860				GAGTATGAAA [G/C] ATGACAGCAT	M	G	C	D	H
G2486u1	WIAF-14075	X59618		RRM2, ribonucleotide reductase M2 polypeptide	543				TCAGCACTGG [G/C] AATCCCTGAA	M	G	C	E	Q
G2486u2	WIAF-14076	X59618		RRM2, ribonucleotide reductase M2 polypeptide	189				TCGCTGCGCC [T/G] CCACTATGCT	-	T	G	-	-
G2486u3	WIAF-14092	X59618		RRM2, ribonucleotide reductase M2 polypeptide	524				TTGACCTCTC [C/G] AAGGACATTC	S	C	G	S	S
G2488u1	WIAF-13585	X63563		POLR2B, polymerase (RNA) II (DNA directed) polypeptide B (140KD)	1633				CCTTGATGGC [G/A] TATATTTCAG	S	G	A	A	A

G2488u2	WIAP-13586	X63563	2452	POLR2B, polymerase (RNA) II (DNA directed) polypeptide B (140kD)	CTGTAGACCG[C/T]GGCTTCTTCA	S	C	T	R	R
G2488u3	WIAP-13587	X63563	2740	POLR2B, polymerase (RNA) II (DNA directed) polypeptide B (140kD)	TCAGAACTAG[T/C]GAGACGGGCA	S	T	C	S	S
G2488u4	WIAP-13602	X63563	1411	POLR2B, polymerase (RNA) II (DNA directed) polypeptide B (140kD)	GGGGTGATCA[A/G]AAGAAAGCTC	S	A	G	Q	Q
G2488u5	WIAP-13603	X63563	2386	POLR2B, polymerase (RNA) II (DNA directed) polypeptide B (140kD)	CAATTGTGGC[C/T]ATTGCATCAT	S	C	T	A	A
G2489u1	WIAP-14181	X63564	1346	POLR2A, polymerase (RNA) II (DNA directed) polypeptide A (220kD)	TGGTGGACAA[T/C]GAGCTGCCTG	S	T	C	N	N
G2489u2	WIAP-14236	X63564	1847	POLR2A, polymerase (RNA) II (DNA directed) polypeptide A (220kD)	TGAATCTTAG[C/T]GTGACAACCTC	?	C	T	?	?
G2489u3	WIAP-14237	X63564	2678	POLR2A, polymerase (RNA) II (DNA directed) polypeptide A (220kD)	CTGAATACAA[C/T]AACTTCAAGT	?	C	T	?	?
G2489u4	WIAP-14238	X63564	3059	POLR2A, polymerase (RNA) II (DNA directed) polypeptide A (220kD)	AGCTCGGCTA[C/T]GGCGAAGAGG	?	C	T	?	?
G2489u5	WIAP-14239	X63564	3877	POLR2A, polymerase (RNA) II (DNA directed) polypeptide A (220kD)	TGGGCCAGTC[C/T]GCTCGAGATG	?	C	T	?	?
G2489u6	WIAP-14240	X63564	3992	POLR2A, polymerase (RNA) II (DNA directed) polypeptide A (220kD)	TGCCTGACTT[T/C]GATGTGGCCC	?	T	C	?	?
G2489u7	WIAP-14245	X63564	3938	POLR2A, polymerase (RNA) II (DNA directed) polypeptide A (220kD)	CCCAGAGCAC[G/A]GTGTGGGAG	?	G	A	?	?
G250u1	WIAP-11696	HT0155	1113	IL3RA, interleukin 3 receptor, alpha (low affinity)	CTGTGTCTTC[G/C]TGATCTGCAG	M	G	C	V	L
G251u1	WIAP-11666	HT0240	179	Interleukin 1 beta convertase	TGGATAAGAC[C/T]CGAGCTTTGA	S	C	T	T	T

G251u2	WIAF-11694	HT0240	973	interleukin 1 beta convertase	GATGCTATTATA [A/G]GAAAGCCAC	M	A	C	K	R
G251u3	WIAF-11695	HT0240	783	interleukin 1 beta convertase	CCCAGATATA [C/T]TACAACTCAA	S	C	T	L	L
G2513u1	WIAF-13736	HT27365	1721	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	AACTATCTAT [G/A]AAAAGCCAAA	M	G	A	M	I
G2513u2	WIAF-13737	HT27365	1741	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	AACTATTGGG [A/T]AATGTGTCA	M	A	T	E	V
G2513u3	WIAF-13738	HT27365	1697	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	AATCTGTTCA [A/G]TACAGGGATT	S	A	G	Q	Q
G2513u4	WIAF-13739	HT27365	1908	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	CTGTGAGATT [G/A]TAGCAATGAA	M	G	A	V	I
G2513u5	WIAF-13740	HT27365	2172	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	TATAGAGATA [C/T]ACGGAATTCC	M	C	T	H	Y
G2513u6	WIAF-13744	HT27365	3019	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	TGGAAGGGCC [A/G]AGGAGATCTG	M	A	G	Q	R
G2513u7	WIAF-13745	HT27365	3024	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	GGGCCAAGGA [G/A]ATCTGTTGAA	M	G	A	D	N
G2513u8	WIAF-13771	HT27365	1079	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	ACATTTTGA [T/C]CTGAGCAAA	S	T	C	D	D

G2513u9	WIAF-13772	HT27365	1546	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	AAGTTGCCTT[C/T]TGATCCAGAT	M	C	T	S	F
G2513u10	WIAF-13773	HT27365	1514	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	AATTAAAAAG[A/T]ATATCATTTG	M	A	T	R	S
G2513u11	WIAF-13774	HT27365	1445	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	AGGTCTTTGG[C/T]AATAAAGTCT	S	C	T	G	G
G2513u12	WIAF-13778	HT27365	2087	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	TTCATATCAA[G/A]ATCATCAGTG	S	G	A	K	K
G2513u13	WIAF-13779	HT27365	2367	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	TGAATGTTTG[C/T]AGCCTGGATA	N	C	T	Q	*
G2513u14	WIAF-13782	HT27365	2719	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	CTCATCACCA[G/A]TGACATACT	M	G	A	S	N
G2513u15	WIAF-13783	HT27365	2567	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	TGATGACAT[C/T]TTTAAATAG	S	C	T	I	I
G2513u16	WIAF-13784	HT27365	2864	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	TAGAAATGGC[G/A]GACACAGTCC	S	G	A	A	A
G2513u17	WIAF-13785	HT27365	2571	PLCB3, phospholipase C, beta 3 (phosphatidylinositol-specific)	TGACATCTTT[A/T]AAATAGCGGT	N	A	T	K	*



G2513u18	WIAF-11786	HT27365	PLCB3, phospholipase C, beta 3 2706 (phosphatidylinositol-specific)	TCTGTCATCT [C/T] GGCTCATCAC	M	C	T	R	W
G252u1	WIAF-10195	HT0425	FCER2, Fc fragment of IgE, low 397 affinity II, receptor for (CD23A)	GAGGGCTGCC [C/T] GGAAGTCTC	M	C	T	R	W
G252u2	WIAF-10206	HT0425	FCER2, Fc fragment of IgE, low 930 affinity II, receptor for (CD23A)	ATGGAGGCCA [T/C] GTGGACTACA	S	T	C	H	H
G253u1	WIAF-10175	HT0573	IFNB1, interferon, beta 1, 228 fibroblast	GGCTTGAATA [C/T] TGCCTCAAGG	S	C	T	Y	Y
G254u1	WIAF-10196	HT0611	466 IL4R, interleukin 4 receptor	TCAGTCCGGA [T/C] AACTATACAC	S	T	C	D	D
G254u2	WIAF-10198	HT0611	1474 IL4R, interleukin 4 receptor	CATGCCTTCT [T/C] CCACCTTCGG	S	T	C	L	L
G254u3	WIAF-10207	HT0611	1902 IL4R, interleukin 4 receptor	ACTGGCTATC [A/G] GGAGTTTGTA	M	A	G	Q	R
G260u1	WIAF-10186	HT1090	IL1R1, interleukin 1 receptor, 453 type 1	TGTTATATAG [C/G] ACAAGCCATA	M	C	G	A	G
G261u1	WIAF-10187	HT1101	434 IL7R, interleukin 7 receptor	CCTGAGTGTC [A/G] TCTATCGGGA	M	A	G	I	V
G261u2	WIAF-10203	HT1101	517 IL7R, interleukin 7 receptor	TTTAAATGCA [T/C] GATGTAGCTT	S	T	C	H	H
G267u1	WIAF-11735	HT1877	IL2RB, interleukin 2 receptor, 881 beta	TCCTCGTGGG [C/T] CTCAGCGGGG	S	C	T	G	G
G267u2	WIAF-11759	HT1877	IL2RB, interleukin 2 receptor, 379 beta	AGTCAAGCAT [C/T] CTGGCCCTGC	M	C	T	S	F
G268u1	WIAF-11758	HT1985	568 CD19 antigen	GCCTCGGTG [G/C] TCCCACCGAG	M	G	C	V	L
G268u2	WIAF-11734	HT1985	783 CD19 antigen	ACGATCGCCC [G/T] GCCAGAGATA	S	G	T	P	P
G270u1	WIAF-11736	HT2415	530 IL6R, interleukin 6 receptor	AGGAGGTGGC [A/G] AGAGGCGTGC	S	A	G	A	A
G270u2	WIAF-11760	HT2415	1590 IL6R, interleukin 6 receptor	CATTGCCATT [G/A] TTCTGAGGTT	M	G	A	V	I
G270u3	WIAF-11737	HT2415	1510 IL6R, interleukin 6 receptor	CCAGTGCAAG [A/C] TTCTTCTTCA	M	A	C	D	A
G270u4	WIAF-11761	HT2415	1451 IL6R, interleukin 6 receptor	CTACTAATAA [A/T] GACGATGATA	M	A	T	K	N

G270u5	WIAF-11766	HT2415	1843	IL6R, interleukin 6 receptor	TTCCCCAGAT [A/G] GCTGGCTGGG	N	A	G	*	W
G270u6	WIAF-11767	HT2415	1829	IL6R, interleukin 6 receptor	ATACAGACTA [C/T] TTCTTCCCA	S	C	T	Y	Y
G271u1	WIAF-11762	HT2531	577	CD2, CD2 antigen (p50), sheep red blood cell receptor	TCAGAGGTC [A/G] TCACACAA	M	A	G	I	V
G271u2	WIAF-11739	HT2531	861	CD2, CD2 antigen (p50), sheep red blood cell receptor	GGAAGCCCCA [A/C] CAAATCCAG	M	A	C	X	H
G271u3	WIAF-11768	HT2531	818	CD2, CD2 antigen (p50), sheep red blood cell receptor	CTGGAGACAA [G/A] AGCCACAGA	M	G	A	R	K
G271u4	WIAF-11738	HT2531	736	CD2, CD2 antigen (p50), sheep red blood cell receptor	CCTCTTGATG [G/A] TCTTTGTGGC	M	G	A	V	I
G273u1	WIAF-11763	HT3139	667	IL2RA, interleukin 2 receptor, alpha	ATCATGGTGC [C/T] TGGCTGCCAG	M	C	T	P	L
G273u2	WIAF-11764	HT3139	956	IL2RA, interleukin 2 receptor, alpha	AAAGTCCAAT [G/C] CAGCCAGTGG	M	G	C	M	I
G273u3	WIAF-11765	HT3139	701	IL2RA, interleukin 2 receptor, alpha	ACGATGACCC [G/A] CCAGAGATCC	S	G	A	P	P
G273u4	WIAF-11740	HT3139	1133	IL2RA, interleukin 2 receptor, alpha	AAATGACCCA [C/T] GGAAGACAA	S	C	T	H	H
G273u5	WIAF-11769	HT3139	1163	IL2RA, interleukin 2 receptor, alpha	AGCCCGAGCT [C/A] ATATGCACAG	S	C	A	L	L
G276u1	WIAF-10192	HT3670	644	CD4 antigen	CTGGTAGTAG [C/G] CCTCAGTGC	M	C	G	S	R
G276u2	WIAF-10193	HT3670	1535	CD4 antigen	CCTGCCAGTG [T/C] CCTCAGCGGT	S	T	C	C	C
G276u3	WIAF-10205	HT3670	1217	CD4 antigen	TGATGCTGAG [T/C] TTGAAACTGG	S	T	C	S	S
G277u1	WIAF-10007	D10232	851	RENBP, renin-binding protein	CACGTGATTG [A/G] CAGTTTCCTA	M	A	G	D	G
G277u2	WIAF-10032	D10232	842	RENBP, renin-binding protein	CTTCGAGCCC [A/G] CGTGATTGAC	M	A	G	H	R
G277u3	WIAF-10042	D10232	634	RENBP, renin-binding protein	GCTGGCGGGC [A/G] AATACCGAGA	M	A	G	K	E
G279u1	WIAF-10047	K01740	1658 [A]	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	ACTGATGTCC [G/A] TCCTTTGTAT	M	G	A	R	H

G279u2	WIAF-10049	K01740	2328 A)	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	CCTTACTGAA[G/A]GTTTCTAGTT	S	G	A	K	K
G279u3	WIAF-10050	K01740	4650 A)	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	CTGTTCTCCC[G/A]AAACCACT	S	G	A	P	P
G279u4	WIAF-10061	K01740	6919 A)	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	CCAGAAGACA[A/G]TGAAGTCAC	M	A	G	M	V
G279u5	WIAF-10080	K01740	480 A)	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	TTAAGAACAT[G/A]GCTTCCCATC	M	G	A	M	I
G279u6	WIAF-10082	K01740	2129 A)	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	TACATTCTAA[G/A]CATTGGAGCA	M	G	A	S	N
G279u7	WIAF-10084	K01740	2533 A)	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	GTTTGCACAC[A/G]GAACACCTAT	M	A	G	R	G
G279u8	WIAF-10086	K01740	6639 A)	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	ACCTCCCAAT[T/C]ATTGCTCGAT	S	T	C	I	I
G279u9	WIAF-10087	K01740	5957 A)	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	GAGATTATC[G/A]CTTCCATGCA	M	G	A	R	H
G279a10	WIAF-10495	K01740	5829 A)	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	TCACAGTACA[G/A]GAATTGCTC	S	G	A	Q	Q
G279a11	WIAF-10496	K01740	5852 A)	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	TTTTTCACCA[T/G]CTTTGATGAG	M	T	G	I	S
G279a12	WIAF-10502	K01740	2492 A)	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	ACCACAATTC[C/T]AGAAATGAC	M	C	T	P	L
G279a13	WIAF-10503	K01740	6906 A)	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	TGCAAGTGA[C/T]TTCCAGAAGA	S	C	T	D	D
G279a14	WIAF-13120	K01740	1980 A)	F8C, coagulation factor VIIIc, procoagulant component (hemophilia)	CAGAGATAT[A/C]CAACGCTTTC	S	A	C	I	I

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G272a15	WIAP-13121	K01740	1982 A	F8C, coagulation factor VIIIc, procoagulant component (hemophilia A)	GAGAAATATAC (A/C)ACGCTTTCTC	M	A	C	Q	P
G282u1	WIAP-10067	L25615	976	AVPR1A, arginine vasopressin receptor 1A	CGCCTTTCTT (C/A)ATCATCCAGA	M	C	A	F	L
G282u2	WIAP-10070	L25615	460	AVPR1A, arginine vasopressin receptor 1A	TCGGCATGTT (T/C)GGCTCGCCT	S	T	C	P	P
G282u3	WIAP-10071	L25615	343	AVPR1A, arginine vasopressin receptor 1A	GCCTGGCCGA (C/T)CTGGCCGTGG	S	C	T	D	D
G282u4	WIAP-10072	L25615	68	AVPR1A, arginine vasopressin receptor 1A	TCTCTCGCC (G/A)GTCCCGACGC	M	G	A	G	S
G282u5	WIAP-10073	L25615	535	AVPR1A, arginine vasopressin receptor 1A	AGACTCTGCA (A/G)CAGCCCGGC	S	A	G	Q	Q
G282u6	WIAP-10092	L25615	1075	AVPR1A, arginine vasopressin receptor 1A	CCTTGAATAG (C/A)TGCTGTATC	M	C	A	S	R
G282a7	WIAP-10499	L25615	1089	AVPR1A, arginine vasopressin receptor 1A	TGTAATCCCT (G/A)GATATACATG	N	G	A	N	*
G284u1	WIAP-10182	M16827	1179	ACADM, acyl-Coenzyme A dehydrogenase, C-4 to C-12 straight chain	AATATCCTGT (A/G)GAAAACTAA	S	A	G	V	V
G284a2	WIAP-10515	M16827	696	ACADM, acyl-Coenzyme A dehydrogenase, C-4 to C-12 straight chain	TTGTGGAAGC (A/G)GATACCCAG	S	A	G	A	A
G285u1	WIAP-10108	M28372	258	ZNF9, zinc finger protein 9 (a cellular retroviral nucleic acid binding protein)	CTCTCCAGA (T/C)ATTGTATC	S	T	C	D	D
G289u1	WIAP-10041	M63012	172	PON1, paraoxonase 1	CTCTGAAGAC (A/T)TGGAGATACT	M	A	T	M	L
G290u1	WIAP-10085	M63959	354	LRPAP1, low density lipoprotein-related protein-associated protein-1 (alpha-2-macroglobulin receptor-associated protein 1)	CTCATACGCA (A/G)CCTCAATCTC	M	A	G	N	S

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G290a2	WIAF-13122	M63959			LRPAP1, low density lipoprotein-related protein-associated protein 1 (alpha-2-macroglobulin receptor-associated protein 1)	223	AGCGACTGCA [T/A]CTTCTCCCG	M	T	A	H	Q
G292u1	WIAF-10180	M74096			ACADL, acyl-Coenzyme A dehydrogenase, long chain	1002	AGTGCACAT [A/C]AATTAGCAGA	M	A	C	K	Q
G293u1	WIAF-10068	M74775			LIPA, lipase A, lysosomal acid, cholesterol esterase (Wolman disease)	723	AAGGACTTAT [T/C]TGGAGACAAA	M	T	C	F	S
G293a2	WIAF-10497	M74775			LIPA, lipase A, lysosomal acid, cholesterol esterase (Wolman disease)	107	TGAGGGGTCT [G/A]GAGGNAACT	M	G	A	G	R
G293a3	WIAF-10498	M74775			LIPA, lipase A, lysosomal acid, cholesterol esterase (Wolman disease)	86	GGTTCTCTGG [C/A]CCCTGCATTC	M	C	A	P	T
G295u1	WIAF-10057	U04270			KCNH2, potassium voltage-gated channel, subfamily H, member 2	1282	AAAGGAGCGA [A/T]CCCACAATGT	M	A	T	T	S
G295u2	WIAF-10062	U04270			KCNH2, potassium voltage-gated channel, subfamily H, member 2	1875	CGCACTGGCT [A/G]GCCTGCATCT	S	A	G	L	L
G295u3	WIAF-10064	U04270			KCNH2, potassium voltage-gated channel, subfamily H, member 2	2040	ACTTCACCTT [C/T]AGCAGCCTCA	S	C	T	P	F
G295u4	WIAF-10088	U04270			KCNH2, potassium voltage-gated channel, subfamily H, member 2	1650	CCGGCCGCAT [C/T]GCCGTCCACT	S	C	T	I	I
G295u5	WIAF-10090	U04270			KCNH2, potassium voltage-gated channel, subfamily H, member 2	2139	CCCTCATGTA [T/C]CCTAGCATCT	S	T	C	Y	Y
G2951u1	WIAF-14147	MT0030			ZNF42, zinc finger protein 42 (myeloid-specific retinoic acid-responsive)	1334	CCCTGCTCTG [A/G]TCACCACCCG	M	A	G	I	V

G2951u2	WIAF-14157	HT0030	1558	ZNF42, zinc finger protein 42 (myeloid-specific retinoic acid- responsive)	ACCAGCTTAC[G/A]CACACCGAGG	S	G	A	T	T
G2959u1	WIAF-13501	HT0134	1014	GRLF1, glucocorticoid receptor DNA binding factor 1	GTGGAGAGAC[T/C]CTGCATAGCT	S	T	C	T	T
G2959u2	WIAF-13518	HT0134	1853	GRLF1, glucocorticoid receptor DNA binding factor 1	GAGCCATCTT[A/C]CAGCCTGTTT	M	A	C	Y	S
G296a1	WIAF-10514	U12778	961	ACADSB, acyl-Coenzyme A dehydrogenase, short/branched chain	TATTCATAT[A/G]TTAAGAAAG	M	A	G	I	V
G2968u1	WIAF-12699	HT0244	1754	SMARCA1, SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 1	CAGAAGAAGAC[C/T]AGTACGTGTA	M	C	T	P	L
G2968u2	WIAF-12716	HT0244	2624	SMARCA1, SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 1	TGGGAACGTT[G/T]CAATGAATTA	M	G	T	C	P
G297u1	WIAF-10109	U16660	402	ECH1, enoyl Coenzyme A hydratase 1, peroxisomal	ACATGGCTTC[G/A]GACATCCTGC	S	G	A	S	S
G297u2	WIAF-10110	U16660	149	ECH1, enoyl Coenzyme A hydratase 1, peroxisomal	GCACAGAGG[A/C]GGCTTCGGA	M	A	C	E	A
G2970u1	WIAF-12746	HT0281	682	BR140: bromodomain-containing protein, 140kD (peregryn)	ATGACATGGA[C/T]GAGGAGGACT	S	C	T	D	D
G2975u1	WIAF-12729	HT0334	1104	B-cell-specific transcription factor	AGTTTCCGG[G/A]AGTCCCTACA	S	G	A	G	G
G2975u2	WIAF-12730	HT0334	1185	B-cell-specific transcription factor	GCTCCCCCTA[C/T]TATTATAGCG	S	C	T	Y	Y
G2976a1	WIAF-12129	HT0340	1600	SATB1, special AT-rich sequence binding protein 1 (binds to nuclear matrix/scaffold- associating DNA's)	GTCCTGCCCC[C/A]CTCATCAGCA	S	C	A	P	P

G2976u2	WIAP-12743	HT0340	2116	SATB1, special AT-rich sequence binding protein 1 (binds to nuclear matrix/scaffold-associating DNA's)	TGGCCTCTCC[A/G]GCAGAGTCAG	S	A	G	P	P
G2978u1	WIAP-12721	HT0346	1140	MSX1, msh (Drosophila) homeo box homolog 1 (formerly homeo box 7)	CATAGAGGGT[C/T]CCAGGTCCCC	-	C	T	-	-
G298u1	WIAP-10048	U33837	8995	Human glycoprotein receptor gp330 precursor, mRNA, complete cds.	CCGCACAGGA[G/A]GTGCATTCCC	M	G	A	R	K
G298u2	WIAP-10051	U33837	13217	Human glycoprotein receptor gp330 precursor, mRNA, complete cds.	ATGCAGCCAT[C/T]GAACCTGCCTA	S	C	T	I	I
G298u3	WIAP-10077	U33837	6298	Human glycoprotein receptor gp330 precursor, mRNA, complete cds.	AACTCTTTCA[IT/C]TGTGTGTTCA	M	T	C	I	T
G298u4	WIAP-10078	U33837	6371	Human glycoprotein receptor gp330 precursor, mRNA, complete cds.	CCATGGTGCC[G/A]GTGCAGGCC	S	G	A	P	P
G298u5	WIAP-10079	U33837	6914	Human glycoprotein receptor gp330 precursor, mRNA, complete cds.	ACTCTGAAGT[G/A]ATTCGTTATG	S	G	A	V	V
G298u6	WIAP-10081	U33837	8718	Human glycoprotein receptor gp330 precursor, mRNA, complete cds.	GTTCCAAATGC[G/A]CATCTGGGCG	M	G	A	A	T
G298u7	WIAP-10083	U33837	9088	Human glycoprotein receptor gp330 precursor, mRNA, complete cds.	ACTTGCTCTG[A/G]AAATGAATTC	M	A	G	E	G
G298u8	WIAP-10096	U33837	6949	Human glycoprotein receptor gp330 precursor, mRNA, complete cds.	ACTCCTTATG[G/C]CATCACTGTT	M	G	C	G	A
G298u9	WIAP-10097	U33837	7149	Human glycoprotein receptor gp330 precursor, mRNA, complete cds.	TTGCTTGGA[A/G]ACAATGGTGG	M	A	G	N	D
G298u10	WIAP-10100	U33837	8590	Human glycoprotein receptor gp330 precursor, mRNA, complete cds.	TACACAAAT[G/A]TCATAATTCA	M	G	A	C	Y

G2980u11	WIAF-10101	U33837	12948	Human glycoprotein receptor gp330 precursor, mRNA, complete cds.	CATCTTTGAA[G/C]ACCAGTTATA	M	G	C	D	H
G2980u1	WIAF-12723	HT0356	437	TLE1, transducin-like enhancer of split 1, homolog of Drosophila E(spl)	TCATGCCAC[G/A]GACCCCCAGT	M	G	A	G	R
G2980u2	WIAF-12726	HT0356	2044	TLE1, transducin-like enhancer of split 1, homolog of Drosophila E(spl)	ACTGGCTGGC[A/G]GTGGGCATGG	S	A	G	A	A
G2980u3	WIAF-12747	HT0356	379	TLE1, transducin-like enhancer of split 1, homolog of Drosophila E(spl)	CCATGGCAGA[G/A]TTGAATGCCA	S	G	A	E	E
G2980u4	WIAF-12748	HT0356	276	TLE1, transducin-like enhancer of split 1, homolog of Drosophila E(spl)	ATCGCCACAGA[G/A]ATTGAATACG	M	G	A	R	K
G2980u5	WIAF-12749	HT0356	1876	TLE1, transducin-like enhancer of split 1, homolog of Drosophila E(spl)	GCCACACAGA[C/T]GGAGCCAGCT	S	C	T	D	D
G2980u6	WIAF-12750	HT0356	1759	TLE1, transducin-like enhancer of split 1, homolog of Drosophila E(spl)	CCGCCTGCTA[C/T]GCCCTGGCCA	S	C	T	Y	Y
G2981u1	WIAF-12720	HT0357	2206	TLE2, transducin-like enhancer of split 2, homolog of Drosophila E(spl)	ACAAATACAT[T/C]GTGACAGGCT	S	T	C	I	I
G2981u2	WIAF-12737	HT0357	1036	TLE2, transducin-like enhancer of split 2, homolog of Drosophila E(spl)	CGGACAGCGT[C/T]GCCCTGAGGA	S	C	T	V	V
G2981u3	WIAF-12740	HT0357	2181	TLE2, transducin-like enhancer of split 2, homolog of Drosophila E(spl)	CTGAGTTGTG[A/T]CATCTCCAGA	M	A	T	D	V



G2983u1	WIAF-12813	HT0360		TLE3, transducin-like enhancer of split 3, homolog of Drosophila 636 E(spl)	TGTCACCCCTC [G/C] GAAAGCCTCC	S	G	C	S	S
G2983u2	WIAF-12834	HT0360		TLE3, transducin-like enhancer of split 3, homolog of Drosophila 1944 E(spl)	TGCACACAC [G/A] GTGCGTCCT	S	G	A	T	T
G2983u3	WIAF-12848	HT0360		TLE3, transducin-like enhancer of split 3, homolog of Drosophila 1710 E(spl)	ACCTGGCCTC [G/A] CCCACGCCCC	S	G	A	S	S
G2985u1	WIAF-12724	HT0421		995 homeotic protein D3	GGCTTCGCCA [G/A] CGCCAACCTG	M	G	A	S	N
G2985u2	WIAF-12725	HT0421		1003 homeotic protein D3	CAGCGCAAC [C/T] TGCAGGGCAG	S	C	T	L	L
G2986u1	WIAF-14124	HT0468		1197 CSDA, cold shock domain protein A	GCCGTGGATP [C/T] CGCGGTCCT	S	C	T	Y	Y
G2987u1	WIAF-12758	HT0474		2068 ZNF7, zinc finger protein 7 (KOX 4, clone HF.16)	AGTGGTTT [C/T] GAATATGGGA	S	C	T	Y	Y
G2987u2	WIAF-12773	HT0474		985 ZNF7, zinc finger protein 7 (KOX 4, clone HF.16)	GAGAGAAGC [G/C] TAGGAATGTG	S	G	C	P	P
G2987u3	WIAF-12775	HT0474		1278 ZNF7, zinc finger protein 7 (KOX 4, clone HF.16)	AGCCAGCAGT [C/T] GCAGCTGGTT	M	C	T	S	L
G3005a1	WIAF-12133	HT0735		1441 homeotic protein 5.1	GAGGCAGCG [C/T] CCCGGCCTG	S	C	T	G	G
G3008a1	WIAF-12134	HT0753		1850 ATF4, activating transcription factor 4 (tax-responsive enhancer element B67)	TAAAAGAGAG [G/A] GCGGATCC	S	G	A	R	R
G3008u2	WIAF-12798	HT0753		946 ATF4, activating transcription factor 4 (tax-responsive enhancer element B67)	CCCTTCGACC [C/A] GTCGGGTTG	M	C	A	P	Q
G3008u3	WIAF-12812	HT0753		1482 ATF4, activating transcription factor 4 (tax-responsive enhancer element B67)	CACTGCTTAC [G/A] TTGCCATGAT	M	G	A	V	I
G3008u4	WIAF-12813	HT0753		1847 ATF4, activating transcription factor 4 (tax-responsive enhancer element B67)	CTCTAAAAGA [G/C] AGGGCGGATT	M	G	C	E	D

G301u1	WIAF-10127	U71285		3639	MTR, 5-methyltetrahydrofolate-homocysteine methyltransferase	TGTGAGACT [C/T] GCAGACATCG	S	C	T	L	L
G3012u1	WIAF-12794	HT0873		402	MAD, MAX dimerization protein	TGCTGCCACT [G/T] GGACCCGAAT	S	G	T	L	L
G3014u1	WIAF-14183	HT0899		274	homeotic protein 2, distal-less	AAAAGACTCA [G/A] TACTTGGCCT	S	G	A	Q	Q
G3020u1	WIAF-12797	HT0956		852	MLL3, myeloid/lymphoid or mixed-lineage leukemia (trithorax (Drosophila) homolog); translocated to, 3	GTGCCTTCAA [A/G] GAACCTTCCA	S	A	G	K	K
G3023u1	WIAF-13724	HT0966		381	zinc finger, X-linked, duplicated	GCTGCAGCAA [G/A] CAATATGACA	S	G	A	K	K
G3023u2	WIAF-13725	HT0966		220	zinc finger, X-linked, duplicated	GGCCAAACTC [G/A] GCGCCACCA	M	G	A	G	S
G3023u3	WIAF-13726	HT0966		69	zinc finger, X-linked, duplicated	AGTCGCAGCA [T/C] AAACCTGCGC	S	T	C	D	D
G3023u4	WIAF-13727	HT0966		249	zinc finger, X-linked, duplicated	ACTTCGAACC [C/T] GAGAGGCCTT	S	C	T	P	P
G3023u5	WIAF-13765	HT0966		661	zinc finger, X-linked, duplicated	CAGGTTCTCT [G/A] CTCGCAGTAG	M	G	A	A	T
G3023u6	WIAF-13766	HT0966		1302	zinc finger, X-linked, duplicated	TGACTCCTTC [G/T] AGCACCCCTT	S	G	T	S	S
G3027u1	WIAF-12800	HT1035		124	HOXB7, homeo box B7	TTATGCGAAT [G/A] CTTTATTTC	M	G	A	A	T
G3027u2	WIAF-12816	HT1035		450	HOXB7, homeo box B7	GGGACTCGGA [C/T] TTGGCGCCG	S	C	T	D	D
G3028u1	WIAF-12806	HT1037		701	homeotic protein C8	AGACCTTGA [A/G] CTGGAGAGG	S	A	G	E	E
G3029u1	WIAF-14153	HT1100		441	zinc finger protein 8	TCAGACTCAG [G/A] GAAAACTGCG	S	G	A	R	R
G3029u2	WIAF-14155	HT1100		1416	zinc finger protein 8	GGCGTGAACA [A/G] TCCTCGAGCA	S	A	G	Q	Q
G303u1	WIAF-10000	X13916		4110	LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	ATGGAGCTGG [G/A] GCCCGACAC	M	G	A	G	E
G303u2	WIAF-10001	X13916		4012	LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	GCGAGCTCTG [C/T] GACCAGTGCT	S	C	T	C	C

G303u3	WIAF-10002	XI3916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	4702					GCCTGCCCG [C/T] ATTGAGCAG	S	C	T	R	R
G303u4	WIAF-10003	XI3916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	6395					CTGGATTCGA [G/A] GCAACATCTA	M	G	A	G	S
G303u5	WIAF-10004	XI3916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	6937					AAGGCACC AA [C/T] GTGTGGCGG	S	C	T	N	N
G303u6	WIAF-10005	XI3916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	9391					GGCTGAAGGA [T/C] GACGGCCGA	S	T	C	D	D
G303u7	WIAF-10011	XI3916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	766					ACTGCATGGA [C/T] GGCTCAGATG	S	C	T	D	D
G303u8	WIAF-10015	XI3916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	9040					ACCCGACCTG [C/T] GCCCCCAGTG	S	C	T	C	C
G303u9	WIAF-10019	XI3916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	11749					CCCTGCGCTG [C/T] AACATGTTG	S	C	T	C	C
G303u10	WIAF-10020	XI3916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	1917					GACCAATATG [G/A] GAAGCCGGT	M	G	A	G	E
G303u11	WIAF-10021	XI3916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	4810					AGAAGCCCAT [C/T] CTTTGGATTG	S	C	T	I	I

G303u12	WIAF-10022	X13916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	6367	TTGGCCGTGT [G/C]GAGGCAATG	S	G	C	V	V
G303u13	WIAF-10023	X13916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	6247	CTGTGGCAT [C/T]GACTTCCAG	S	C	T	I	I
G303u14	WIAF-10024	X13916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	8371	ACGCCTCAGA [T/C]GAGTGAAC	S	T	C	D	D
G303u15	WIAF-10030	X13916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	11395	ACGGCAGCGA [C/T]GAGGAGCCT	S	C	T	D	D
G303u16	WIAF-10031	X13916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	12763	ACGTCTTTGA [G/A]GATTACATCT	S	G	A	E	E
G303u17	WIAF-10035	X13916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	640	ACGGATCTGA [C/T]GAGGCCCTG	S	C	T	D	D
G303u18	WIAF-10037	X13916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	1609	GCCGCTTGT [C/T]TACTGGCAG	S	C	T	V	V
G303u19	WIAF-10038	X13916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	1629	GATGCTATC [T/G]GACTATATT	M	T	G	L	R
G303u20	WIAF-10039	X13916		LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	2210	CACCAGCTAC [C/T]TCATTGGCCG	M	C	T	L	F

G303u21	WIAF-10043	X13916		7287	LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	GATGGCTCCA [G/A]GAGGATCACC	M	G	A	R	K
G303u22	WIAF-10044	X13916		8258	LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	CTCTGACGAG [A/G]TCCCTTGCAA	M	A	G	I	V
G303u23	WIAF-10045	X13916		11871	LRP1, low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)	GTGCGACCG [A/G]GAAAGCGGCC	M	A	G	E	G
G303u1	WIAF-14097	HT1128		611	PSMC3, proteasome (prosome, macropain) 26S subunit, ATPase, 3	TGGGGATCCA [A/G]CCTCCAAAAG	S	A	G	Q	Q
G3034u1	WIAF-12836	HT1182		137	TCF12, transcription factor 12 (HTF4, helix-loop-helix transcription factors 4)	ATRAGGGAGC [G/A]TGAGGAGTCT	M	G	A	R	H
G3034u2	WIAF-12837	HT1182		421	TCF12, transcription factor 12 (HTF4, helix-loop-helix transcription factors 4)	ATCTTCAATT [A/G]TGGGTTTCCTT	M	A	G	M	V
G3038u1	WIAF-12864	HT1373		1700	NFKB1, nuclear factor of kappa light polypeptide gene enhancer in B-cells 1 (p105)	AGAGNAGGCT [A/G]TGCAGCTTGC	M	A	G	M	V
G3038u2	WIAF-12881	HT1373		1936	NFKB1, nuclear factor of kappa light polypeptide gene enhancer in B-cells 1 (p105)	TGTACCAGAC [G/A]CCCTTGCACT	S	G	A	T	T
G3038u3	WIAF-12882	HT1373		2641	NFKB1, nuclear factor of kappa light polypeptide gene enhancer in B-cells 1 (p105)	AGCTGCAGCT [G/C]TATAAGTTAC	S	G	C	L	L
G3039u1	WIAF-13027	HT1375		3761	GLI3, GLI-Kruppel family member GLI3 (Greig cephalopolysyndactyly syndrome)	RACAGCCCCG [G/T]AAGTGGCACC	M	G	T	G	V

G3039u2	WIAF-13028	HT1375		3963	GLI3, GLI-Kruppel family member GLI3 (Greig cephalopolysyndactyly syndrome)	CGCCAAATGA [G/T]TCAGCTGSCA	M	G	T	E	D
G3040u1	WIAF-12242	HT637		158	FABP3, fatty acid binding protein 3, muscle and heart (mammary- derived growth inhibitor)	CTCACCTTAA [A/G]AACACACAGC	M	A	G	K	R
G3043u1	WIAF-12867	HT1486		842	IRF2, interferon regulatory factor 2	GTGCCGAGGG [G/A]CGGCCACACT	S	G	A	G	G
G3047u1	WIAF-12875	HT1518		1233	transcription factor 1, nucleolar	TCCGTTTCT [C/T]GAGAGCCTGC	S	C	T	L	L
G3047u2	WIAF-12876	HT1518		1746	transcription factor 1, nucleolar	GGATTAAGAA [G/A]GCAGCCGAG	S	G	A	K	K
G3047u3	WIAF-12877	HT1518		1829	transcription factor 1, nucleolar	TCCAAGAAGA [T/C]GAAATTCAG	M	T	C	M	T
G3048u1	WIAF-12884	HT1530		628	transcription factor USF	AGTGAGGCT [C/T]GCCGCCGAGA	M	C	T	R	C
G305u1	WIAF-10150	HT0034		777	prolyl 4-hydroxylase, beta subunit/protein disulfide isomerase/thyroid hormone-binding protein, alt. transcript 1	CCCTTGTCAT [C/T]GAGTTACCG	S	C	T	I	I
G305u2	WIAF-10154	HT0034		186	prolyl 4-hydroxylase, beta subunit/protein disulfide isomerase/thyroid hormone-binding protein, alt. transcript 1	TGGCGGCCCA [C/A]AGTACCTGC	M	C	A	H	Q
G305u3	WIAF-10155	HT0034		1428	prolyl 4-hydroxylase, beta subunit/protein disulfide isomerase/thyroid hormone-binding protein, alt. transcript 1	GCACGCTCAT [T/C]GATTACAACG	S	T	C	I	I
G3050u1	WIAF-12860	HT1558		2098	FSRG1: female sterile homeotic- related gene 1 (mouse homolog)	AACATTGCRA [T/C]GGCATTTTGA	S	T	C	N	N
G3050u2	WIAF-12861	HT1558		2845	FSRG1: female sterile homeotic- related gene 1 (mouse homolog)	TAGGCCCTTC [T/C]GGCTTTGGAC	S	T	C	S	S

G3050u3	WIAF-12862	HT1558		3409	FSRG1: female sterile homeotic-related gene 1 (mouse homolog)	CCTCGTCGTC [G/A] TCTTCAGACA	S	G	A	S	S
G3050u4	WIAF-12874	HT1558		1699	FSRG1: female sterile homeotic-related gene 1 (mouse homolog)	TCTCTTCTGT [G/C] TCACACACAG	S	G	C	V	V
G3050u5	WIAF-12878	HT1558		2093	FSRG1: female sterile homeotic-related gene 1 (mouse homolog)	GTTAAACAT [T/G] GCAATGGCAT	M	T	G	C	G
G3050u6	WIAF-12879	HT1558		2746	FSRG1: female sterile homeotic-related gene 1 (mouse homolog)	CTGGGGCCGA [C/T] GAAGATGACA	S	C	T	D	D
G3051u1	WIAF-12866	HT1569		1423	MEF2B, MADS box transcription enhancer factor 2, polypeptide B (myocyte enhancer factor 2B)	CTTGCCGAC [G/A] GCTGCCCCCG	S	G	A	T	T
G3051u2	WIAF-13022	HT1569		661	MEF2B, MADS box transcription enhancer factor 2, polypeptide B (myocyte enhancer factor 2B)	CAGAGTACAG [C/T] GAGCCCCAG	S	C	T	S	S
G3057a1	WIAF-12142	HT1669		5565	alpha-fetoprotein enhancer-binding protein	AGACTGCTCT [T/C] GAGGCTCATA	S	T	C	L	L
G3057a2	WIAF-12143	HT1669		5634	alpha-fetoprotein enhancer-binding protein	CTCTGTCTGC [G/A] ATGCTCTTAG	S	G	A	A	A
G3057a3	WIAF-12144	HT1669		5664	alpha-fetoprotein enhancer-binding protein	GGGACTCCA [G/T] ATGAAGGAG	M	G	T	Q	H
G3057a4	WIAF-12145	HT1669		5703	alpha-fetoprotein enhancer-binding protein	GCTTTTCCCA [C/T] CTACCCCCAA	S	C	T	H	H
G3057u5	WIAF-12885	HT1669		2227	alpha-fetoprotein enhancer-binding protein	TCTGGAGATC [C/T] ATATGAGGTC	M	C	T	H	Y
G3057u6	WIAF-12892	HT1669		3720	alpha-fetoprotein enhancer-binding protein	AGACCTTGCC [G/A] GCTCAGCTAC	S	G	A	P	P
G3057u7	WIAF-12893	HT1669		4137	alpha-fetoprotein enhancer-binding protein	CAAGGTTTAC [G/A] GACTACCAGC	S	G	A	T	T
G3057u8	WIAF-12897	HT1669		4783	alpha-fetoprotein enhancer-binding protein	GAAGACCAAC [A/C] CTCGCCAGCA	M	A	C	T	P

G3057u9	WIAF-12898	HT1669	5215	alpha-fetoprotein enhancer-binding protein	TCCAACCTCC[A/C]CAATGAACAC	M	A	C	T	P
G3057u10	WIAF-12904	HT1669	7266	alpha-fetoprotein enhancer-binding protein	CCCTGCAGGC[C/T]GCCGTGACTT	S	C	T	A	A
G3057u11	WIAF-12907	HT1669	8345	alpha-fetoprotein enhancer-binding protein	CCAAACAGACG[A/C]CTATTCCGAG	M	A	C	D	A
G3057u12	WIAF-12943	HT1669	4257	alpha-fetoprotein enhancer-binding protein	TGGTGTGGTT[T/C]CAGAAATGCC	S	T	C	F	F
G3057u13	WIAF-12951	HT1669	7333	alpha-fetoprotein enhancer-binding protein	ACCAGGCTTT[T/A]CTCCTTATTA	M	T	A	S	T
G3057u14	WIAF-13030	HT1669	303	alpha-fetoprotein enhancer-binding protein	GCAGCCTGTC[G/A]GAGGACGAGT	S	G	A	S	S
G3057u15	WIAF-13031	HT1669	777	alpha-fetoprotein enhancer-binding protein	GCCTTCCAGA[G/A]GAGGACGAGG	S	G	A	E	E
G306u1	WIAF-10118	HT0040	1618	CPT2, carnitine palmitoyltransferase II	CTCTACTGCC[G/A]TCCACTTTGA	M	G	A	V	I
G307u1	WIAF-10076	HT0114	110	EDN2, endothelin 2	CGTTGCGCTA[G/A]CCCTGCTCGT	M	G	A	A	T
G3070u1	WIAF-12972	HT2085	625	pre-B-cell leukemia transcription factor 3	AGAAATATGA[A/G]CAGGCATGTA	S	A	G	E	E
G3070u2	WIAF-12973	HT2085	841	pre-B-cell leukemia transcription factor 3	GTAACCTTCAG[T/C]AAACAGGCCA	S	T	C	S	S
G3071u1	WIAF-12886	HT2086	995	AGER, advanced glycosylation end product-specific receptor	CCTGCGAGGC[T/C]GTGATGATCC	S	T	C	A	A
G3071u2	WIAF-12887	HT2086	1475	AGER, advanced glycosylation end product-specific receptor	GAGGCCAGAT[C/G]TACAGCCAC	M	C	G	I	M
G3071u3	WIAF-12935	HT2086	933	AGER, advanced glycosylation end product-specific receptor	ACGCATGGTG[A/G]GCATCATCCA	M	A	G	S	G
G3071u4	WIAF-12936	HT2086	1052	AGER, advanced glycosylation end product-specific receptor	GTAACCTTCAG[C/T]AAACAGGCCA	S	C	T	S	S
G3071u5	WIAF-12937	HT2086	836	AGER, advanced glycosylation end product-specific receptor	AGAAGTATGA[G/A]CAGGCATGTA	S	G	A	E	E
G308u1	WIAF-10094	HT0192	484	ANX4, annexin IV (placental anticoagulant protein II)	ATGGAGGGAG[C/G]CTTGAGATG	M	C	G	S	R



G3080u2	WIAF-10095	HT0192		ANX4, annexin IV (placental 333 anticoagulant protein II)	GGGATGATGA [C/T] GCCCAAGGTG	M	C	T	T	M
G3081u1	WIAF-12997	HT2198		PSMC2, proteasome (prosome, 689 macropain) 26S subunit, Arpase, 2	GGCATTGAGC [C/T] TCCCAAGGC	M	C	T	P	L
G3083u1	WIAF-12976	HT2228		IGHMBP2, immunoglobulin mu 106 binding protein 2	TGCTGGAGCT [T/C] CAGAGAGAGC	S	T	C	L	L
G3083u2	WIAF-12985	HT2228		IGHMBP2, immunoglobulin mu 2260 binding protein 2	TGGAGTTTCAT [G/C] GCCACAAAGA	M	G	C	M	I
G3083u3	WIAF-12985	HT2228		IGHMBP2, immunoglobulin mu 2060 binding protein 2	GGGACTTGCT [A/G] CGTCCACCAG	M	A	G	T	A
G3083u4	WIAF-12987	HT2228		IGHMBP2, immunoglobulin mu 2365 binding protein 2	ACGACAGTTC [C/T] GGGGAAGGGA	S	C	T	S	S
G3083u5	WIAF-13005	HT2228		IGHMBP2, immunoglobulin mu 411 binding protein 2	TTTGATGAGT [C/T] CCACGATTTC	M	C	T	S	F
G3083u6	WIAF-13006	HT2228		IGHMBP2, immunoglobulin mu 272 binding protein 2	ATACGGGTCC [G/A] CGGAGCTCT	M	G	A	A	T
G3083u7	WIAF-13010	HT2228		IGHMBP2, immunoglobulin mu 2581 binding protein 2	TCAGGAGCG [G/A] CAGGGGCAGC	S	G	A	A	A
G3083u8	WIAF-13011	HT2228		IGHMBP2, immunoglobulin mu 2594 binding protein 2	GGGGAGCCC [G/A] CCAGCAAAGGA	M	G	A	A	T
G3088u1	WIAF-12984	HT2318		HIVEP1, human immunodeficiency virus type I enhancer-binding protein 1	TGTGGCACTA [C/T] GTCCCCCTCC	M	C	T	T	M
G3088u2	WIAF-12988	HT2318		HIVEP1, human immunodeficiency virus type I enhancer-binding protein 1	TCTTGTACC [A/G] CGTCAACACC	S	A	G	P	P
G3088u3	WIAF-12989	HT2318		HIVEP1, human immunodeficiency virus type I enhancer-binding protein 1	TTCTTGGTAC [T/C] GGACAGTCCC	S	T	C	T	T
G3088u4	WIAF-12991	HT2318		HIVEP1, human immunodeficiency virus type I enhancer-binding protein 1	TTATCCGGCA [G/T] CACAACATCC	M	G	T	Q	H

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G3088u5	WIAF-12992	HT2318		4880	HIV-1, human immunodeficiency virus type I enhancer-binding protein 1	CAATCCATG [C/G] ACCGCTAGC	M	C	G	A	G
G3088u6	WIAF-12993	HT2318		5148	HIV-1, human immunodeficiency virus type I enhancer-binding protein 1	TTGACAGCAT [G/A] TCTAATGCG	M	G	A	M	I
G3088u7	WIAF-12999	HT2318		5834	HIV-1, human immunodeficiency virus type I enhancer-binding protein 1	CCAGCTGATA [A/G] TTCATCAACA	M	A	G	N	S
G3088u8	WIAF-13000	HT2318		6065	HIV-1, human immunodeficiency virus type I enhancer-binding protein 1	CAAGTCAAC [G/A] GCCAGTCACT	M	G	A	R	Q
G3088u9	WIAF-13001	HT2318		7652	HIV-1, human immunodeficiency virus type I enhancer-binding protein 1	CATAGGATA [C/T] GGTCAAGAA	M	C	T	T	M
G3088u10	WIAF-13008	HT2318		741	HIV-1, human immunodeficiency virus type I enhancer-binding protein 1	TTCTGCAGCA [A/G] CCATCTGAAC	S	A	G	Q	Q
G3088u11	WIAF-13009	HT2318		948	HIV-1, human immunodeficiency virus type I enhancer-binding protein 1	CAGAACTGAG [C/T] ACCTTGTAC	S	C	T	S	S
G3088u12	WIAF-13012	HT2318		1909	HIV-1, human immunodeficiency virus type I enhancer-binding protein 1	TGAACCTTTA [C/T] TAAATCAAG	S	C	T	L	L
G3088u13	WIAF-13013	HT2318		2803	HIV-1, human immunodeficiency virus type I enhancer-binding protein 1	TCTTCTGTCT [G/A] TACCTTCACT	M	G	A	V	I

G3088u14	WIAF-13015	HT2318		3342	HIVSP1, human immunodeficiency virus type I enhancer-binding protein 1	GCGTCTGCA [A/G] CCTCAGATTC	S	A	G	Q	Q
G3088u15	WIAF-13016	HT2318		3542	HIVSP1, human immunodeficiency virus type I enhancer-binding protein 1	CCTAACATA [G/A] TGTACCATA	M	G	A	S	N
G3088u16	WIAF-13017	HT2318		4972	HIVSP1, human immunodeficiency virus type I enhancer-binding protein 1	TGGTCTTCT [A/G] AAAGTGAGGA	M	A	G	K	E
G3095u1	WIAF-12994	HT2435		701	TCF2, transcription factor 2, hepatic; LF-B3; variant hepatic nuclear factor	CCGCTCTGTA [C/T] ACCTGGTACG	S	C	T	Y	Y
G3095u2	WIAF-13018	HT2435		362	TCF2, transcription factor 2, hepatic; LF-B3; variant hepatic nuclear factor	GGGCGAGCC [C/T] GACACCAAGC	S	C	T	P	P
G3095u3	WIAF-13020	HT2435		1620	TCF2, transcription factor 2, hepatic; LF-B3; variant hepatic nuclear factor	CCAGTTCTCC [C/T] AGCAGCTGCA	N	C	T	Q	*
G3100a1	WIAF-12147	HT2483		526	2NF141, zinc finger protein 141 (clone pHZ-44)	GAATGAGTGT [A/G] AGTTGCAGAA	M	A	G	K	E
G3102u1	WIAF-12975	HT2508		259	NR1, nuclear respiratory factor 1	CGCCTTCTTC [G/T] CCCGAGGACA	S	G	T	S	S
G3103u1	WIAF-13617	HT2511		1106	E2F2, E2F transcription factor 2	CCTTGGACCA [G/T] CTCATCCAGA	M	G	T	Q	H
G3103u2	WIAF-13659	HT2511		1154	E2F2, E2F transcription factor 2	CTGAGGACAA [G/A] GCCAACAAGA	S	G	A	K	K
G311u1	WIAF-10291	HT0402		1339	A2M, alpha-2-macroglobulin	GTCCCTGTGA [C/T] GGCTACCAGT	S	C	T	Y	Y
G311u2	WIAF-10292	HT0402		1201	A2M, alpha-2-macroglobulin	TCATATTTCAT [C/T] AGAGGAATG	S	C	T	I	I
G311u3	WIAF-10293	HT0402		3041	A2M, alpha-2-macroglobulin	TACTCCAGAG [G/A] TCAAGTCCAA	M	G	A	V	I

G311u4	WIAF-10294	HT0402	3676	A2M, alpha-2-macroglobulin	TGACATCCTA [T/C] GTGCTCCTCG	S	T	C	Y	Y
G311u5	WIAF-10296	HT0402	3364	A2M, alpha-2-macroglobulin	ATATCACCAT [C/T] GCCCTTCTGG	S	C	T	I	I
G311u6	WIAF-10297	HT0402	3203	A2M, alpha-2-macroglobulin	CCAAGCTCGA [G/T] CCTACATCTT	M	G	T	A	S
G311a7	WIAF-10494	HT0402	1122	A2M, alpha-2-macroglobulin	TCACACTTTC [G/A] ACAGGGAATT	M	G	A	R	Q
G3119u1	WIAF-13947	HT2654	2876	GLI, glioma-associated oncogene homolog (zinc finger protein)	TTTCTGGGGG [G/A] TTCCCAAGTT	M	G	A	G	D
G3119u2	WIAF-13959	HT2654	654	GLI, glioma-associated oncogene homolog (zinc finger protein)	AGTGCCGGGA [G/A] GAACCTTGG	S	G	A	E	E
G3119u3	WIAF-13965	HT2654	3376	GLI, glioma-associated oncogene homolog (zinc finger protein)	TGGGGAACA [G/C] AATTCTCTCAA	M	G	C	E	Q
G312u1	WIAF-10006	HT0428	898	PLAU, plasminogen activator, urokinase	CTCACCACAA [C/T] GACATTGCCT	S	C	T	N	N
G312u2	WIAF-10029	HT0428	498	PLAU, plasminogen activator, urokinase	GGCTAAAGC [C/T] GCTTGTCCAA	M	C	T	P	L
G312a3	WIAF-10521	HT0428	767	PLAU, plasminogen activator, urokinase	TGATTACCCA [A/C] AGAAGGAGGA	M	A	C	K	Q
G3125u1	WIAF-13675	HT2674	740	GTF2F2, general transcription factor IIF, polypeptide 2 (30kD subunit)	ACATCAGAAA [A/G] CAACCTGTGG	S	A	G	K	K
G313u1	WIAF-10129	HT0462	3086	platelet-derived growth factor, alpha polypeptide (GB:M21574)	CATGCGGTGG [G/A] ACTCAGACAA	M	G	A	D	N
G313u2	WIAF-10130	HT0462	1078	platelet-derived growth factor, alpha polypeptide (GB:M21574)	ATGAGAAAGG [T/G] TTCATTGAAA	S	T	G	G	G
G313u3	WIAF-10133	HT0462	1571	platelet-derived growth factor, alpha polypeptide (GB:M21574)	GGAGATCCAC [T/C] CCGAGACAG	M	T	C	S	P
G313u4	WIAF-10135	HT0462	2611	platelet-derived growth factor, alpha polypeptide (GB:M21574)	CTCGCAACGT [C/T] CTCCTGGCAC	S	C	T	V	V

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G314u1	WIAF-10069	HT0467	1890	ALOX15, arachidonate 15-lipoxygenase	TCAGGGAGGA [G/A] CTGGCTGCCC	S	G	A	E	E
G314u1	WIAF-13934	HT27498	878	NFATC3, nuclear factor of activated T-cells, cytoplasmic 3	CCAGAGGATA [G/A] CTGGCTACTC	M	G	A	S	N
G314u2	WIAF-13936	HT27498	1189	NFATC3, nuclear factor of activated T-cells, cytoplasmic 3	GCCTGCCTCA [T/C] GCAATGGAA	M	T	C	C	R
G314u3	WIAF-13938	HT27498	2241	NFATC3, nuclear factor of activated T-cells, cytoplasmic 3	CTCTCGGGG [T/C] TTCCTTCAG	S	T	C	G	G
G314u4	WIAF-13944	HT27498	702	NFATC3, nuclear factor of activated T-cells, cytoplasmic 3	ATGCCTCTGA [C/T] GAGGACGCC	S	C	T	D	D
G315u1	WIAF-13891	HT2757	523	SP4, Sp4 transcription factor	CTTCAAAGA [G/A] AATAACGTTT	S	G	A	E	E
G315u2	WIAF-13892	HT2757	1514	SP4, Sp4 transcription factor	ACAGAATGTT [C/T] AACTTCRAGC	N	C	T	Q	*
G315u3	WIAF-13893	HT2757	2336	SP4, Sp4 transcription factor	TGTTTGTGG [C/T] AAAAGATTCA	S	C	T	G	G
G316u1	WIAF-13860	HT27636	437	transcription factor B-ATF	AGCAGCTCAC [A/G] GAGGAAGTGA	S	A	G	T	T
G316u2	WIAF-13861	HT27636	512	transcription factor B-ATF	CCAGCACGCC [C/G] TCGCCCCCG	S	C	G	P	P
G317u1	WIAF-13556	HT2772	1686	ZNF74, zinc finger protein 74 (C0852)	TGCACAGCGA [G/A] GGAAGCCCT	S	G	A	E	E
G317u1	WIAF-13948	HT2776	2037	transcriptional regulator, via glucocorticoid receptor	TGTTGGGACC [A/G] GAAGCACCCA	S	A	G	P	P
G318u1	WIAF-14036	HT2783	1614	MHC2TA, MHC class II transactivator	ATCCTAGACG [C/G] CTTGAGGAG	M	C	G	A	G
G318u2	WIAF-14037	HT2783	2791	MHC2TA, MHC class II transactivator	TGAGCGACAC [G/A] GTGGCGTGT	S	G	A	T	T
G318u3	WIAF-14059	HT2783	1657	MHC2TA, MHC class II transactivator	TGCACAGCAC [G/A] TGGGAGCCGG	S	G	A	T	T
G318u4	WIAF-14060	HT2783	1606	MHC2TA, MHC class II transactivator	TTCTGCTCAT [C/T] CTAGACGCTT	S	C	T	I	I
G318u1	WIAF-13950	HT27861	392	zinc finger protein C2H2-150	TACTCTAGAG [G/A] AGCCTGTGG	M	G	A	E	K
G318u1	WIAF-13864	HT27862	271	zinc finger protein C2H2-171	GAACTCCAG [T/G] TCAAAGACTT	M	T	G	F	V

G3184u2	WIAF-13865	HT27862	248	zinc finger protein C2H2-171	CTGCTTGAAT [T/C] CATGTATGAR	M	T	C	F	S
G320u1	WIAF-10136	HT0791	552	ANX7, annexin VII (synexin)	CCAACTTCGA [T/C] GCTATAAGAG	S	T	C	D	D
G320u2	WIAF-10137	HT0791	1350	ANX7, annexin VII (synexin)	TTGACCTTGT [A/G] CAAATAAAAC	S	A	G	V	V
G3208u1	WIAF-14186	HT27930	485	zinc finger protein ZNF37A	GTGAGAAGTC [A/G] GCCCTAATTG	S	A	G	S	S
G3218u1	WIAF-13526	HT28104	187	zinc finger protein ZNF169, Krueppel-type	CCGACAGCT [C/T] ATTAAGAAAG	M	C	T	H	Y
G323u1	WIAF-10066	HT0915	1361	Homo sapiens inducible nitric oxide synthase (NOS) mRNA, complete cds.	ACTTCTGTGA [C/T] GTCACGCGCT	S	C	T	D	D
G325u1	WIAF-10106	HT0962	3817	FBN1, fibrillin 1 (Marfan syndrome)	TGTGAATGCC [C/T] GCCTGGCCAT	M	C	T	P	L
G325u2	WIAF-10113	HT0962	722	FBN1, fibrillin 1 (Marfan syndrome)	AGATAGCTCC [T/G] TCCTGTGGCT	S	T	G	P	P
G325u3	WIAF-10114	HT0962	2022	FBN1, fibrillin 1 (Marfan syndrome)	GATCTGCAAT [A/C] ATGGACGCTG	M	A	C	N	H
G325u4	WIAF-10116	HT0962	3603	FBN1, fibrillin 1 (Marfan syndrome)	GAACCTGCACA [G/C] ACATTGACGA	M	G	C	D	H
G325u5	WIAF-10117	HT0962	2270	FBN1, fibrillin 1 (Marfan syndrome)	TCTGCATGAA [C/T] GGGCGTTGCG	S	C	T	N	N
G326u1	WIAF-10036	HT1009	1854	KLKB1, kallikrein B plasma, (Fletcher factor) 1	GCAAAACAAA [C/T] GGAATGTGGC	S	C	T	N	N
G327u1	WIAF-10052	HT1011	1599	HRG, histidine-rich glycoprotein	AAGCCAGACA [A/T] TCAGCCCTTT	M	A	T	N	I
G327u2	WIAF-10054	HT1011	1083	HRG, histidine-rich glycoprotein	CCACTATTGC [C/T] CATGTCCTGC	M	C	T	P	L
G327u3	WIAF-10055	HT1011	1140	HRG, histidine-rich glycoprotein	GCCCAAAGAC [A/G] TTCTCATAT	M	A	G	H	R
G328u1	WIAF-10145	HT1087	255	SAAL, serum amyloid A1	GTGCTGGGC [T/C] GCAGAGTGA	S	T	C	A	A
G328a2	WIAF-10511	HT1087	248	SAAL, serum amyloid A1	CCTGGGGTG [C/T] CTGGGCTGCA	M	C	T	A	V
G328a3	WIAF-10512	HT1087	305	SAAL, serum amyloid A1	TTCTTTGGCC [A/G] TGGTGCGGAG	M	A	G	H	R
G328a4	WIAF-13126	HT1087	295	SAAL, serum amyloid A1	TATCCAGAGA [T/C] TCTTTGGCCA	M	T	C	F	L
G328a5	WIAF-13127	HT1087	82	SAAL, serum amyloid A1	CTTGTCCTG [G/A] GTGTACGAG	M	G	A	G	S
G329u1	WIAF-10140	HT1141	2514	PLCG1, phospholipase C, gamma 1 (formerly subtype 148)	CTGACCTTCA [T/C] CAAGAGCGCC	M	T	C	I	T

G329u2	WIAF-10162	HT1141	1036	PLCG1, phospholipase C, gamma 1 (formerly subtype 148)	TATGCCGGA [C/A] ACCATGAACA	M	C	A	D	E
G329u3	WIAF-10163	HT1141	911	PLCG1, phospholipase C, gamma 1 (formerly subtype 148)	GTTTCATGCTC [A/G] GCTTCTCTCCG	M	A	G	S	G
G3295u1	WIAF-14017	HT3460	1229	FUBP, far upstream element binding protein	CCATAAAAAG [C/T] ATAAGCCAGC	S	C	T	S	S
G3296u1	WIAF-14168	HT3466	6289	transcription factor TFIIIC, RNA polymerase III, alpha subunit	CAGCCTGGAC [G/A] AGAGCCCAT	M	G	A	E	K
G3296u2	WIAF-14179	HT3466	235	transcription factor TFIIIC, RNA polymerase III, alpha subunit	GGGCATCGCT [T/A] TCTATGAGGA	M	T	A	F	I
G3298u1	WIAF-13523	HT3504	1803	DNA-binding protein HRFX2	ACTTTGCCAA [C/T] GTGCAGGAGC	S	C	T	N	N
G3298u2	WIAF-13524	HT3504	1743	DNA-binding protein HRFX2	GGCGGTGCT [G/A] CAGAACACGT	S	G	A	L	L
G3298u3	WIAF-13528	HT3504	2002	DNA-binding protein HRFX2	GTTCTTGCTG [A/G] AATGTCCTT	M	A	G	K	E
G33u1	WIAF-10254	X82540	1044	INHBC, inhibin, beta C	AAGGCCAACA [C/T] AGTGCAGGC	M	C	T	T	I
G33u2	WIAF-10255	X82540	1136	INHBC, inhibin, beta C	CAGCAACATT [G/A] TCAAGACTGA	M	G	A	V	I
G33u3	WIAF-10256	X82540	1185	INHBC, inhibin, beta C	GGGTGCAGTT [A/G] GTCTATGTGT	N	A	G	*	W
G33u4	WIAF-10259	X82540	892	INHBC, inhibin, beta C	TTTTGTGGA [C/T] TTCCGTGAGA	S	C	T	D	D
G3303u1	WIAF-13566	HT3523	981	POU6F1, POU domain, class 6, transcription factor 1	CAGGCCAGGA [G/A] ATCACTGAAA	S	G	A	E	E
G3304u1	WIAF-13932	HT3544	970	SP2, SP2 transcription factor	TCAACAACT [C/T] GTGAACGCCA	S	C	T	L	L
G3304u2	WIAF-13935	HT3544	1891	SP2, SP2 transcription factor	AGAAGCACCT [T/G] TGCACATCC	S	T	G	V	V
G3304u3	WIAF-13943	HT3544	920	SP2, SP2 transcription factor	TGTGTGAAG [T/C] TGACAGGTGG	S	T	C	L	L
G3311u1	WIAF-13839	HT3585	757	GATA3, GATA-binding protein 3	CCCACTCCCG [T/C] GGCACATGA	S	T	C	R	R
G3311u2	WIAF-13840	HT3585	901	GATA3, GATA-binding protein 3	TCCGATGCAA [G/A] TCCAGGCCCA	S	G	A	K	K
G3316u1	WIAF-13818	HT3607	282	zinc finger protein HKE-T1, Kruppel-like	AAAGAGTTTC [A/G] GTCAGAGTTC	M	A	G	S	G

G3319u1	WIAF-14214	HT3613			1086	SMARCA3, SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 3	AACTCTTAC [A/G]GCCATTGCCAG	S	A	G	T	T
G3319u2	WIAF-14221	HT3613			1261	SMARCA3, SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 3	TAGATGTAGT [G/C]AACRACCCAG	M	G	C	E	Q
G3320u1	WIAF-13692	HT3622			624	BCL6, B-cell CLL/lymphoma 6 (zinc finger protein 51)	ATTTCGGGA [G/C]GGCAACATCA	M	G	C	E	D
G3320u2	WIAF-13717	HT3622			1062	BCL6, B-cell CLL/lymphoma 6 (zinc finger protein 51)	ACAGCCGGCC [G/A]ACTTTGGAGG	S	G	A	P	P
G3321u1	WIAF-13761	HT3641			235	STAT2, signal transducer and activator of transcription 2, 235 113kD	TCTTGGATCA [G/C]CTGAACTATG	M	G	C	Q	H
G3321u2	WIAF-13762	HT3641			774	STAT2, signal transducer and activator of transcription 2, 774 113kD	CAAAAAGCCT [G/C]CATCAGAGCT	M	G	C	C	S
G3328u1	WIAF-13543	HT3681			1550	transcription factor znf6	CCACAATGGT [A/G]TCAGAGGAGG	S	A	G	V	V
G3328u2	WIAF-13544	HT3681			1389	transcription factor znf6	AGAGGATTTA [G/C]AGGAAGATGA	M	G	C	E	Q
G3336u1	WIAF-13848	HT3732			216	XBP1, X-box binding protein 1	ACCTGAGCCC [C/T]GAGGAGAAGG	S	C	T	P	P
G334u1	WIAF-10008	HT1220			893	THBS1, thrombospondin 1	TACATTGGCC [A/C]CAAGACAAAG	M	A	C	H	P
G334u2	WIAF-10009	HT1220			2000	THBS1, thrombospondin 1	TCACAGCCCT [T/C]CGGCCAGGGT	M	T	C	F	S
G334u3	WIAF-10016	HT1220			1521	THBS1, thrombospondin 1	CCAGATGAA [T/C]GGAAACCCCT	S	T	C	N	N
G334u4	WIAF-10017	HT1220			2210	THBS1, thrombospondin 1	GGCTGGCCCA [A/G]TCAGAACCTG	M	A	G	N	S
G334u5	WIAF-10018	HT1220			2979	THBS1, thrombospondin 1	GTGAGACCGA [T/C]TTCCGCCGAT	S	T	C	D	D
G334u6	WIAF-10033	HT1220			1136	THBS1, thrombospondin 1	TGTCACCTGTC [A/G]GAACTCAGTT	M	A	G	Q	R
G334u7	WIAF-10034	HT1220			1859	THBS1, thrombospondin 1	AGTGGAAATG [G/A]CATCCAGTGC	M	G	A	G	D
G3343u1	WIAF-13545	HT3770			1104	ZNF76, zinc finger protein 76 (expressed in testis)	GCAGTGCCCA [C/T]GGCGAGCTGG	S	C	T	H	H
G3343u2	WIAF-13561	HT3770			425	ZNF76, zinc finger protein 76 (expressed in testis)	GAGCAGTATG [C/A]CAGCAAGGTT	M	C	A	A	D



G3343u3	WIAF-13562	HT3770	143	ZNF76, zinc finger protein 76 (expressed in testis)	CACCAGGTGA[C/T]GGTACAGAAA	M	C	T	T	M
G3343u4	WIAF-13563	HT3770	646	ZNF76, zinc finger protein 76 (expressed in testis)	GAAGAGCCAC[G/T]TTGGTACCCTA	M	G	T	V	F
G3343u5	WIAF-13564	HT3770	611	ZNF76, zinc finger protein 76 (expressed in testis)	AGCTGTGGAA[A/G]GGCCTTTGCC	M	A	G	K	R
G3344u1	WIAF-13664	HT3772	925	zinc finger protein MAZ	AGCTGTGCA[C/T]TCGGACGAGA	S	C	T	H	H
G3345u1	WIAF-13508	HT3823	315	TCF6L1, transcription factor 6- like 1 (mitochondrial transcription factor 1-like)	TTGATTTTC[T/C]AAGACACAC	S	T	C	S	S
G3345u2	WIAF-13509	HT3823	167	TCF6L1, transcription factor 6- like 1 (mitochondrial transcription factor 1-like)	GGCGTGTGA[G/C]TGCCCTGGGA	M	G	C	S	T
G3345u3	WIAF-13531	HT3823	625	TCF6L1, transcription factor 6- like 1 (mitochondrial transcription factor 1-like)	TTATACGTT[T/G]ATGTAGCTGA	M	T	G	Y	D
G3352u1	WIAF-13589	HT4005	1190	MTF, microphthalmia-associated transcription factor	CTCGAACTG[G/A]GACTGAGGCC	M	G	A	G	E
G3352u2	WIAF-13604	HT4005	1156	MTF, microphthalmia-associated transcription factor	TCTACGGAT[G/A]GCACCATCAC	M	G	A	G	S
G3353u1	WIAF-13937	HT4010	360	GTF2H3, general transcription factor ITH, polypeptide 3 (34kD subunit)	ATCTAATGAC[C/A]AAGATGACA	S	C	A	T	T
G3358u1	WIAF-13671	HT4187	398	ETV5, ets variant gene 5 (ets- related molecule)	GATGATGAAC[A/G]GTTTGTCCCA	M	A	G	Q	R
G3358u2	WIAF-13672	HT4187	223	ETV5, ets variant gene 5 (ets- related molecule)	TCAGCAAGTC[C/T]CTTTTATGGT	M	C	T	P	S

G3358u3	WIAP-13673	HT4187	1236	ETV5, ets variant gene 5 (ets-related molecule)	GACTGGAAGG [C/G] AAAGTCARAC	S	C	G	G	G	G
G3358u4	WIAP-13674	HT4187	1678	ETV5, ets variant gene 5 (ets-related molecule)	TTACCTCTCTG [G/A] ACATGGACCG	M	G	A	D	N	
G3358u5	WIAP-13706	HT4187	414	ETV5, ets variant gene 5 (ets-related molecule)	TCCAGATT [T/C] CAGTCGATA	S	T	C	P	P	
G3358u6	WIAP-13707	HT4187	1238	ETV5, ets variant gene 5 (ets-related molecule)	CTGGAAGGCA [A/G] AGTCAACAG	M	A	G	K	R	
G336u1	WIAP-10152	HT1258	566	ACAT1, acetyl-Coenzyme A acetyltransferase 1 (acetoacetyl Coenzyme A thiolase)	AGAGCATGTC [C/A] AATGTTCCAT	S	C	A	S	S	
G3369u1	WIAP-14047	HT4302	614	zinc finger protein DB1	ATCTCAATCG [A/G] CACAAGCTCT	S	A	G	R	R	
G337u1	WIAP-10268	HT1259	464	EDNRB, endothelin receptor type B	AAAGGAGACA [G/T] GACGGCAGGA	M	G	T	R	M	
G337u2	WIAP-10298	HT1259	1281	EDNRB, endothelin receptor type B	TGAAGCTCAC [T/A] CTTTATATC	S	T	A	T	T	
G3373u1	WIAP-14203	HT4342	1253	MTF1, metal-regulatory transcription factor 1	CTCAACAGAC [A/G] GCTTCCTTGA	S	A	G	T	T	
G3390u1	WIAP-14182	HT4483	680	ZNF133, zinc finger protein 133 (clone PH2-13)	AGAGCCAGAG [C/T] TCTACCTCGA	M	C	T	L	F	
G3390u2	WIAP-14184	HT4483	1026	ZNF133, zinc finger protein 133 (clone PH2-13)	GCTCAGACAG [G/A] GAACCTTGAG	M	G	A	G	E	
G3390u3	WIAP-14185	HT4483	1423	ZNF133, zinc finger protein 133 (clone PH2-13)	AAAAGCCTTA [T/C] GTGTGCGGG	S	T	C	Y	Y	
G3390u4	WIAP-14197	HT4483	811	ZNF133, zinc finger protein 133 (clone PH2-13)	CTGGGGATCC [A/G] GGCCAGGGG	S	A	G	P	P	
G3390u5	WIAP-14198	HT4483	1420	ZNF133, zinc finger protein 133 (clone PH2-13)	GGGAAAAGCC [T/G] TATGTGTGCC	S	T	G	P	P	
G3390u6	WIAP-14199	HT4483	2143	ZNF133, zinc finger protein 133 (clone PH2-13)	CAGCTCTAAT [C/T] ACACACAAGC	S	C	T	I	I	
G3391u1	WIAP-13631	HT4484	391	ZNF136, zinc finger protein 136 (clone PH2-20)	AGCATTGTAT [A/G] TGGAGAAGTC	M	A	G	Y	C	
G3396u1	WIAP-13978	HT4491	1283	ZNF135, zinc finger protein 135 (clone PH2-17)	CACAGCTCCT [C/T] GCTCAGCCAG	M	C	T	S	L	
G3396u2	WIAP-13979	HT4491	1296	ZNF135, zinc finger protein 135 (clone PH2-17)	TCAGCCAGCA [C/T] GAAAAGGACG	S	C	T	H	H	
G3396u3	WIAP-13980	HT4491	1028	ZNF135, zinc finger protein 135 (clone PH2-17)	AGTCACAGCT [C/T] GTCCCTCACC	M	C	T	S	L	

G3396u4	WIAF-13981	HT4491		1057	ZNF135, zinc finger protein 135 (clone PHZ-17)	GGGAATCCAC [A/G] CTGGGGAGAA	M	A	G	T	A
G3396u5	WIAF-13982	HT4491		1152	ZNF135, zinc finger protein 135 (clone PHZ-17)	CAGGAGAGAA [A/G] CCCTATGAAT	S	A	G	K	K
G3396u6	WIAF-13983	HT4491		1243	ZNF135, zinc finger protein 135 (clone PHZ-17)	AAAGCGTAT [G/C] GGTGCAATGA	M	G	C	G	R
G3396u7	WIAF-13984	HT4491		1045	ZNF135, zinc finger protein 135 (clone PHZ-17)	CACCAACAT [C/T] AGCGAATCCA	N	C	T	Q	*
G340u1	WIAF-10139	HT1386		459	CYP27A1, cytochrome P450, subfamily XXVIIA (steroid 27- hydroxylase, cerebrotendinous xanthomatosis), polypeptide 1	CCTATGGGC [G/A] TTCACCAACG	S	G	A	P	P
G340u2	WIAF-10160	HT1386		801	CYP27A1, cytochrome P450, subfamily XXVIIA (steroid 27- hydroxylase, cerebrotendinous xanthomatosis), polypeptide 1	TCCCAAGT [G/A] ACTGCCCG	N	G	A	W	*
G341u1	WIAF-10121	HT1388		912	MUT, methylmalonyl Coenzyme A mutase	GAGCTGGCCT [A/G] TACTTTAGCA	M	A	G	Y	C
G341u2	WIAF-10128	HT1388		2087	MUT, methylmalonyl Coenzyme A mutase	TGCTGTGGGC [G/A] TAAGCACCT	M	G	A	V	I
G3410u1	WIAF-13749	HT4550		1720	zinc finger homeodomain protein	TGAGTCCTCT [G/T] TTTCATCAGC	M	G	T	V	F
G3410u2	WIAF-13750	HT4550		2843	zinc finger homeodomain protein	AAACATCATT [T/C] GATTGAACAC	M	T	C	L	S
G3410u3	WIAF-13751	HT4550		2745	zinc finger homeodomain protein	AGATATTCCA [A/T] AAGAGTAGTT	M	A	T	Q	H
G3410u4	WIAF-13775	HT4550		236	zinc finger homeodomain protein	AGAGAAGGA [A/C] TGCTAAGAAC	M	A	C	N	T
G3410u5	WIAF-13776	HT4550		195	zinc finger homeodomain protein	TGCCAACAGA [C/T] CAGACAGTGT	S	C	T	D	D
G3410u6	WIAF-13777	HT4550		606	zinc finger homeodomain protein	ATTACTTTAG [T/C] TGCTCCCTGT	S	T	C	S	S
G3410u7	WIAF-13793	HT4550		2073	zinc finger homeodomain protein	CAGTTTACC [A/G] GTGGGATCAA	S	A	G	P	P
G343u1	WIAF-10120	HT1552		561	HK1, hexokinase 1	CTTGCCNACA [A/G] TCCAAATAG	S	A	G	Q	Q

G343u2	WIAF-10124	HT1552	159	HK1, hexokinase 1	ACAAGTATCT[G/C]TATGCCATGC	S	G	C	L	L
G348u1	WIAF-10269	HT1906	2212	PECAM1, platelet/endothelial cell adhesion molecule (CD31 antigen)	TGACGATGTC[A/G]GAACCATGC	S	A	G	G	G
G348u2	WIAF-10277	HT1906	1656	PECAM1, platelet/endothelial cell adhesion molecule (CD31 antigen)	GCCATTCCCA[C/T]GCCAAAATGT	S	C	T	H	H
G348u3	WIAF-10283	HT1906	577	PECAM1, platelet/endothelial cell adhesion molecule (CD31 antigen)	AGAGTACCAG[C/G]TGTTGGTGGGA	S	C	G	V	V
G348a5	WIAF-13119	HT1906	?	PECAM1, platelet/endothelial cell adhesion molecule (CD31 antigen)	ATTGTTCCC[C/G]	?	C	G		
G351u1	WIAF-10123	HT1990	1047	OSBP, oxysterol binding protein	TGCTGGCAGA[G/A]TCAGATGAAT	S	G	A	E	E
G351u2	WIAF-10132	HT1990	1023	OSBP, oxysterol binding protein	TGGCCAAGGC[C/A]AAAGCTGTGA	S	C	A	A	A
G355u1	WIAF-10146	HT2143	1670	THBS4, thrombospondin 4	AACTGCCTGA[G/A]TGCTTTAAAT	M	G	A	S	N
G355u2	WIAF-10165	HT2143	1186	THBS4, thrombospondin 4	TCGAATGGA[G/C]CGTGGTTCC	M	G	C	A	P
G355a3	WIAF-10510	HT2143	1962	THBS4, thrombospondin 4	ACTGCCCCAC[C/G]GTCATTAACA	S	C	G	T	T
G355a4	WIAF-13125	HT2143	1963	THBS4, thrombospondin 4	CTGCCCCACC[G/A]TCATTAACAG	M	G	a	V	I
G3552u1	WIAF-12701	HT28101	1006	CLCN2, chloride channel 2	AAGAGACTAT[T/C]ACAGCCCTCT	S	T	C	I	I
G3552u2	WIAF-12731	HT28101	1823	CLCN2, chloride channel 2	CCGCCACCAG[C/T]AGTACCGGGT	N	C	T	Q	*
G3552u3	WIAF-12736	HT28101	2254	CLCN2, chloride channel 2	GGAGGGCAGA[G/C]TCGGCAGGCA	M	G	C	E	D
G3565u1	WIAF-12744	HT2896	334	calyculin	GCCCTCAAGG[G/A]CTGAAAATAA	M	G	A	G	D
G357u1	WIAF-10267	HT2244	4300	C4B, complement component 4B	ATGAGTACGA[T/C]GAGCTTCCAG	S	T	C	D	D
G357u2	WIAF-10280	HT2244	5095	C4B, complement component 4B	TCATGGGTCT[G/A]GATGGGGCCA	S	G	A	L	L
G357u3	WIAF-10295	HT2244	2996	C4B, complement component 4B	CTCAGATCCA[T/C]TGGACACTTT	S	T	C	L	L
G359u1	WIAF-10026	HT2411	936	PLAT, plasminogen activator, tissue	CGCAGGCTGA[A/G]GTGGGAGTAC	M	A	G	T	M
G359a2	WIAF-10520	HT2411	1444	PLAT, plasminogen activator, tissue	AGGCCTTGTC[T/C]CCTTCTTATT	S	T	C	S	S

G352u1	WIAF-12759	HT4214	743	CLCN4, chloride channel 4	CTTCTAACGA [G/A] ACCACTTTTG	S	G	A	E	B
G352u2	WIAF-12761	HT4214	835	CLCN4, chloride channel 4	GCATTACATTC [T/G] GAATTACTTA	M	T	G	L	R
G361u1	WIAF-10053	HT2479	857	cystathionine beta synthase, alt. transcript 1	TGGCTCACTA [C/T] GACACCACCG	S	C	T	Y	Y
G361u2	WIAF-10056	HT2479	1097	cystathionine beta synthase, alt. transcript 1	TCATCCCCAC [G/A] GTGCTGGACA	S	G	A	T	T
G362u1	WIAF-10058	HT2638	223	ADRB2, adrenergic, beta-2-, receptor, surface	GGCACCCCAAT [G/A] GAAGCCATGC	M	G	A	G	R
G362u2	WIAF-10059	HT2638	429	ADRB2, adrenergic, beta-2-, receptor, surface	TCATGGCCCT [G/A] GCAGTGGTGC	S	G	A	L	L
G362u3	WIAF-10060	HT2638	256	ADRB2, adrenergic, beta-2-, receptor, surface	CGTCACGCAG [G/C] AAAGGGACGA	M	G	C	E	Q
G362u4	WIAF-10093	HT2638	1230	ADRB2, adrenergic, beta-2-, receptor, surface	AGGCCTATGG [G/C] AATGGCTACT	S	G	C	G	G
G3620u1	WIAF-12808	HT97200	458	ACATN, acetyl-Coenzyme A transporter	CACCTCTCTGG [A/G] TATGAAGAGC	M	A	G	D	G
G3627u1	WIAF-12820	HT97387	347	NAPG, N-ethylmaleimide-sensitive factor attachment protein, gamma	GCAGAAACTA [C/T] CAGAGGCCGT	M	C	T	P	S
G366u1	WIAF-10046	HT2764	987	BDKRB2, bradykinin receptor B2	GCCTCCTTCA [T/C] GGCTACAGC	M	T	C	M	T
G366a2	WIAF-10500	HT2764	820	BDKRB2, bradykinin receptor B2	AGATCCAGAC [G/A] GAGAGGAGGG	S	G	A	T	T
G366a3	WIAF-10501	HT2764	961	BDKRB2, bradykinin receptor B2	GCATCATCGA [T/C] GTAATCACAC	S	T	C	D	D
G367u1	WIAF-10156	HT27685	6965	ACACA, acetyl-Coenzyme A carboxylase alpha	ATCATCCATA [T/C] GACCCAGCAC	N	T	C	*	C
G370u1	WIAF-10281	HT27888	3250	LEPR, leptin receptor	AAATTTCTCC [G/A] TTGAAGGATT	S	G	A	P	P
G370u2	WIAF-10282	HT27888	3229	LEPR, leptin receptor	TCACCAAGTG [C/T] TTCTCTAGCA	S	C	T	C	C
G370u3	WIAF-10284	HT27888	1005	LEPR, leptin receptor	CAATATCAAG [T/C] GAAATATCA	M	T	C	V	A
G370u4	WIAF-10285	HT27888	1894	LEPR, leptin receptor	CAGAGAATAA [C/T] CTTCAATTCC	S	C	T	N	N
G370u5	WIAF-10299	HT27888	1222	LEPR, leptin receptor	TTCTGACAAAG [T/C] GTTGGGTCTA	S	T	C	S	S
G370u6	WIAF-10300	HT27888	2161	LEPR, leptin receptor	CTATGAAAAA [G/C] GAGAAAAAATG	M	G	C	K	N
G371u1	WIAF-10107	HT27943	349	CRAT, carnitine acetyltransferase	TCATCTACTC [G/C] AGCCACGGCG	S	G	C	S	S
G371a2	WIAF-12093	HT27943	287	CRAT, carnitine acetyltransferase	GGAGAACTGG [C/T] TGCTGTGAGTG	S	C	T	L	L

G372a1	WIAF-10506	HT28247			HADHA, hydroxyacyl-Coenzyme A dehydrogenase/3-ketoacyl-Coenzyme A thiolase/enoyl-Coenzyme A hydratase (trifunctional protein), alpha subunit	TGGAGCTCCA [C/A] AGAAGGATGT	M	C	A	Q	K
G374u1	WIAF-10103	HT28496		1099	FASN, fatty acid synthase	CACCTCCAC [G/A] TCCCGAGGT	M	G	A	V	I
G374u2	WIAF-10104	HT28496		4435	FASN, fatty acid synthase	CTGGACAGGG [T/C] GACCCGAGAG	M	T	C	V	A
G374u3	WIAF-10105	HT28496		5996	FASN, fatty acid synthase	CAAGAGCTAC [A/G] TCATCGCTGG	M	A	G	I	V
G374u4	WIAF-10115	HT28496		5644	FASN, fatty acid synthase	TGGCACACAT [C/T] TGGGCGATCC	S	C	T	I	I
G374u5	WIAF-10119	HT28496		6387	FASN, fatty acid synthase	GGGCGATCAA [C/T] GTCCTGCTGA	S	C	T	N	N
G374a6	WIAF-12094	HT28496		567	FASN, fatty acid synthase	ACATGGCCCA [A/G] GGAAGACACA	S	A	G	Q	Q
G377u1	WIAF-10142	HT2996		5520	FASN, fatty acid synthase						
G377u2	WIAF-10143	HT2996			PCCB, propionyl Coenzyme A carboxylase, beta polypeptide	GGACCCGGCT [T/C] CCGTCCGTGA	M	T	C	S	P
G380u1	WIAF-10122	HT3159		929	PCCB, propionyl Coenzyme A carboxylase, beta polypeptide	CACCTTTGTG [G/A] TGATACCAAC	M	G	A	G	D
G380u2	WIAF-10126	HT3159		1416	INSR, insulin receptor	TCTACCTTGA [C/T] GGCAGGTGTG	S	C	T	D	D
G380u4	WIAF-11605	HT3159		831	INSR, insulin receptor	GGCAGGATGC [A/G] TGTGTTCCA	S	A	G	A	A
G383u1	WIAF-10125	HT33546		1698	INSR, insulin receptor	GCCTGCCAC [G/A] AGTCCGGAGG	S	G	A	T	T
G385u1	WIAF-10141	HT3383		2382	phospholipase C, beta 3, alt. transcript 2	AGCAGCGGGC [G/A] AGGCTCCCCC	M	G	A	R	Q
G385u2	WIAF-10157	HT3383		3633	PRCP, prolylcarboxypeptidase (angiotensinase C)	ATGACAGTGC [A/G] GGAAGCAGC	S	A	G	A	A
G387u1	WIAF-11729	HT3439		1505	PRCP, prolylcarboxypeptidase (angiotensinase C)	ATCACAGACA [C/G] TCTGGTTGCA	M	C	G	T	S
G387u2	WIAF-11770	HT3439		1360	SREBF2, sterol regulatory element binding transcription factor 2	CACCTCCAG [G/C] AGCTCCGTGC	M	G	C	R	S
G388u1	WIAF-10270	HT3440		2697	SREBF2, sterol regulatory element binding transcription factor 2	GCTGCTGCCG [C/G] CAACCTACAA	M	C	G	A	G
G390u1	WIAF-10276	HT3568		1901	245 SELPLG, selectin P ligand	CTCCAGAAAT [G/A] CTGAGGAACA	M	G	A	M	I
				2049	NOS3, nitric oxide synthase 3 (endothelial cell)	TTGCTCGTGC [C/G] GTGACACAC	S	C	G	A	A

G391u1	WIAF-10013	HT3630	6205 VWF, von Willebrand factor	AGGACCTGGA [G/C] GTGATTCTCC	M	G	C	E	D
G391u2	WIAF-10265	HT3630	4554 VWF, von Willebrand factor	GCCCTGAGA [A/G] CAAGGCCTTC	M	A	G	N	S
G391u3	WIAF-10266	HT3630	7489 VWF, von Willebrand factor	TGGCCTCAAC [C/T] GCCACCAATG	S	C	T	T	T
G391u4	WIAF-10272	HT3630	2470 VWF, von Willebrand factor	ACTGTACCAT [G/A] AGTGGAGTCC	M	G	A	M	I
G391u5	WIAF-10273	HT3630	2615 VWF, von Willebrand factor	GCTCGAGTGT [A/G] CCAAAAGCTG	M	A	G	T	A
G391u6	WIAF-10274	HT3630	2635 VWF, von Willebrand factor	GCCAGAACTA [T/C] GACCTGGAGT	S	T	C	Y	Y
G391u7	WIAF-10275	HT3630	4045 VWF, von Willebrand factor	TCTCGGAACC [G/A] CCGTTGCACG	S	G	A	P	P
G391u8	WIAF-10278	HT3630	4446 VWF, von Willebrand factor	AACCTTGTCC [G/A] CTACGTCCAG	M	G	A	R	H
G391u9	WIAF-10279	HT3630	5152 VWF, von Willebrand factor	GCCTAATGTC [C/T] AAGCTGCAGG	S	C	T	A	A
G391u10	WIAF-10286	HT3630	3448 VWF, von Willebrand factor	TTACCACTGA [C/T] GTCTCCAGG	S	C	T	D	D
G391u11	WIAF-10287	HT3630	4891 VWF, von Willebrand factor	ACATGGTGAC [C/T] GTGGAGTACC	S	C	T	T	T
G391u12	WIAF-10288	HT3630	4805 VWF, von Willebrand factor	CAGGAGCAAG [G/A] AGTTCACTGA	M	G	A	E	K
G391u13	WIAF-10289	HT3630	4943 VWF, von Willebrand factor	CCTGCAGCGG [G/T] TCGAGAGAT	M	G	T	V	L
G391u14	WIAF-10290	HT3630	4915 VWF, von Willebrand factor	TCAGCGAGGC [A/C] CAGTCCAAAG	S	A	C	A	A
G391a15	WIAF-10517	HT3630	6194 VWF, von Willebrand factor	AAACRAAGAG [C/T] AGGACTCTGA	N	C	T	Q	*
G391a16	WIAF-13222	HT3630	6419 VWF, von Willebrand factor	TCACCTTGGT [C/T] ACATCTTCAC	M	C	T	H	Y
G394lu1	WIAF-14123	HT3464	1265 mannosidase, alpha, lysosomal	CAGGTGTGCA [A/G] CCAGCTGGAG	M	A	G	N	S
G394lu2	WIAF-14135	HT3464	965 mannosidase, alpha, lysosomal	ACCAACCACA [C/T] TGTGATGACC	M	C	T	T	I
G395u1	WIAF-10271	HT4158	ECe1, endothelin converting enzyme 1	TCACCTGCCGA [T/C] CAGCTCAGGA	S	T	C	D	D

G395a2	WIAF-13110	HT4158	ECB1, endothelin converting enzyme 1	1493	CATCTACAC [A/T] TGATAGGATA	M	A	T	M	L
G3959u1	WIAF-13634	HT4490	ADTB1, adaptin, beta 1 (beta prime)	250	TGAAGAACT [G/A] GTATACCTCT	S	G	A	L	L
G3959u2	WIAF-13640	HT4490	ADTB1, adaptin, beta 1 (beta prime)	2039	TTCTTGGCG [T/C] GGCCTTGACA	S	T	C	G	G
G3959u3	WIAF-13641	HT4490	ADTB1, adaptin, beta 1 (beta prime)	2395	AGGTCAACG [G/A] CCACTCAGCC	S	G	A	A	A
G3967u1	WIAF-13997	HT2958	ACTC, actin, alpha, cardiac	918	GAGGACCAAC [T/C] ATGTACCCCTG	S	T	C	T	T
G3968u1	WIAF-14159	HT1986	ACTN3, actinin, alpha 3	1747	CGAGGTGAC [C/T] GAGAGCGAGG	N	C	T	R	*
G3968u2	WIAF-14164	HT1986	ACTN3, actinin, alpha 3	1900	GGTGCCACG [C/T] GTGACCAGAC	M	C	T	R	C
G3968u3	WIAF-14165	HT1986	ACTN3, actinin, alpha 3	2184	ACACCGTCTA [C/T] AGCATGAGC	S	C	T	Y	Y
G3968u4	WIAF-14167	HT1986	ACTN3, actinin, alpha 3	2557	GATCTGGCA [G/A] GAGACAAGNA	M	G	A	G	R
G3968u5	WIAF-14175	HT1986	ACTN3, actinin, alpha 3	1212	GGCTGTCTC [G/A] GAGATCCGCG	S	G	A	S	S
G3979u1	WIAF-13884	HT0623	776 GPC1, glypican 1	776	TGCTGTGCC [T/G] GATGACTACC	S	T	G	P	P
G3979u2	WIAF-13885	HT0623	680 GPC1, glypican 1	680	TGTACTACG [C/T] GGTGCCAACC	S	C	T	R	R
G3979u3	WIAF-13886	HT0623	1361 GPC1, glypican 1	1361	AGCTGTCTC [T/C] GAAGCCAAGG	S	T	C	S	S
G3979u4	WIAF-13887	HT0623	1163 GPC1, glypican 1	1163	AGAGTGTAT [C/T] GGCAGCGTGC	S	C	T	I	I
G3979u5	WIAF-13888	HT0623	1670 GPC1, glypican 1	1670	ACGCCAGTA [C/T] GACGGCAGGG	S	C	T	D	D
G3979u6	WIAF-13905	HT0623	1069 GPC1, glypican 1	1069	CTTGCCAAAC [A/T] GGCCGACCTG	M	A	T	Q	L
G3979u7	WIAF-13906	HT0623	1514 GPC1, glypican 1	1514	TCATGGTGA [C/T] GGCCTGGCCA	S	C	T	D	D
G3979u8	WIAF-13907	HT0623	1720 GPC1, glypican 1	1720	GACCTCTCG [G/C] CGGGAAGGTC	M	G	C	G	A
G3979u9	WIAF-13908	HT0623	1676 GPC1, glypican 1	1676	GTGACGACG [C/T] AGCGGCTCGG	S	C	T	G	G
G3979u10	WIAF-13909	HT0623	1719 GPC1, glypican 1	1719	TGACCTCTG [G/A] GCGGAAGGT	M	G	A	G	S
G399u1	WIAF-10102	HT48511	450 AQP3, aquaporin 3	450	TCTGGCACTT [T/C] GCGCAACAC	S	T	C	F	F
G399u2	WIAF-10111	HT48511	192 AQP3, aquaporin 3	192	GCTCCGTGG [C/T] CAGGTTGTGC	S	C	T	A	A
G399u3	WIAF-10112	HT48511	165 AQP3, aquaporin 3	165	CCCTCATCT [C/G] GTGATGTTTG	S	C	G	L	L
G3997u1	WIAF-13649	HT27682	MFAP2, microfibrillar-associated protein 2	473	TGTGTGCCA [C/T] GAGSAGCTCC	S	C	T	H	H
G3997u2	WIAF-13650	HT27682	MFAP2, microfibrillar-associated protein 2	377	CCATACACAG [G/T] CCTTGCAAC	M	G	T	R	S
G3997u3	WIAF-13876	HT27682	MFAP2, microfibrillar-associated protein 2	453	GGAGATCTGT [G/T] TTCGTACAGT	M	G	T	V	F
G4022u1	WIAF-14020	HT2426	TGM1, transglutaminase 1 (K polypeptide epidermal type I, protein-glutamine-gamma-glutamyltransferase)	240	TGGCTGCTGT [T/C] CATGCCGAAA	M	T	C	S	P



G4022u2	WIAF-14021	HT2426		TGM1, transglutaminase 1 (K polypeptide epidermal type I, protein-glutamine-gamma-371 glutamyltransferase)	CCCGGGCAG [C/T] GGTGTCAATG	S	C	T	S	S
G4022u3	WIAF-14022	HT2426		TGM1, transglutaminase 1 (K polypeptide epidermal type I, protein-glutamine-gamma-506 glutamyltransferase)	ACGAGCTGAT [A/G] GTGGCGCGG	M	A	G	I	M
G4022u4	WIAF-14031	HT2426		TGM1, transglutaminase 1 (K polypeptide epidermal type I, protein-glutamine-gamma-2491 glutamyltransferase)	GCTGGAGGTG [A/T] CAGTCACTTA	M	A	T	D	V
G4038u1	WIAF-13998	HT4211		LAMB3, laminin, beta 3 (nicein (125kD), kalinin (140kD), BM600 (125kD))	GGTGGCAGTC [C/A] CAGATGATG	S	C	A	S	S
G4038u2	WIAF-13999	HT4211		LAMB3, laminin, beta 3 (nicein (125kD), kalinin (140kD), BM600 (125kD))	CTTCATCTAC [C/T] TGTGGACTGA	S	C	T	T	T
G4038u3	WIAF-14002	HT4211		LAMB3, laminin, beta 3 (nicein (125kD), kalinin (140kD), BM600 (125kD))	GAGGCTACTG [C/T] AATCGCTACC	S	C	T	C	C
G4038u4	WIAF-14003	HT4211		LAMB3, laminin, beta 3 (nicein (125kD), kalinin (140kD), BM600 (125kD))	GACCAGGCAG [A/T] TGATTAGGGC	M	A	T	M	L
G4038u5	WIAF-14018	HT4211		LAMB3, laminin, beta 3 (nicein (125kD), kalinin (140kD), BM600 (125kD))	TTTCTCCGAG [C/T] TTCATCTACC	M	C	T	A	V
G4038u6	WIAF-14019	HT4211		LAMB3, laminin, beta 3 (nicein (125kD), kalinin (140kD), BM600 (125kD))	CACGGCCATG [C/T] TGATCGCTGC	M	C	T	A	V
G4038u7	WIAF-14023	HT4211		LAMB3, laminin, beta 3 (nicein (125kD), kalinin (140kD), BM600 (125kD))	AGTGTGATCC [G/A] GATGGGGCAG	S	G	A	P	P
G4038u8	WIAF-14025	HT4211		LAMB3, laminin, beta 3 (nicein (125kD), kalinin (140kD), BM600 (125kD))	CTATGGAGAC [G/A] TGCCACACAG	M	G	A	V	M
G4038u9	WIAF-14026	HT4211		LAMB3, laminin, beta 3 (nicein (125kD), kalinin (140kD), BM600 (125kD))	GGCTGTGAAC [C/T] GTGTGCCTGC	M	C	T	P	L

G4038u10	WIAF-14029	HT4211		LAMB3, laminin, beta 3 (nicein (125kD), kalinin (140kD), BM600 (125kD))	3562	CCTGACAGGA [C/T] TGGAGAACGG	S	C	T	L	L
G4038u11	WIAF-14030	HT4211		LAMB3, laminin, beta 3 (nicein (125kD), kalinin (140kD), BM600 (125kD))	3546	TGCTGCGCTC [A/G] GCGGACCTGA	S	A	G	S	S
G4045u1	WIAF-13571	HT0652		1266 adducin, beta subunit	1266	TGGAGCAGGA [G/T] AAGCACCGGC	M	G	T	E	D
G4050u1	WIAF-14106	HT1466		1366 villin	1366	CGTTGGCAG [G/A] GCAGCCAGGC	M	G	A	G	S
G4050u2	WIAF-14107	HT1466		1468 villin	1468	GGTCCCAATG [G/A] GCAAGGAGCC	M	G	A	G	S
G4050u3	WIAF-14108	HT1466		1932 villin	1932	CCACAGAGAT [C/T] CCGACTTCA	S	C	T	I	I
G4050u4	WIAF-14110	HT1466		2438 villin	2438	TTTGGGATGA [C/T] TCCAGCTGCC	M	C	T	T	I
G4057u1	WIAF-13648	HT33633		371 CNN3, calponin 3, acidic	371	TTCAGGCTTA [T/C] GGTATGAGC	S	T	C	Y	Y
G4066u1	WIAF-13676	HT4301		654 troponin T, beta, skeletal	654	AGATTGACAA [G/A] TTCGAGTTG	S	G	A	K	K
G4066u2	WIAF-13677	HT4301		774 troponin T, beta, skeletal	774	GCAAAGTCGG [C/T] GGGCGCTGGA	S	C	T	G	G
G4066u3	WIAF-13708	HT4301		625 troponin T, beta, skeletal	625	GGAGCTCTGG [G/C] AGACCCCTGCA	M	G	C	E	Q
G4080u1	WIAF-14142	HT1396		HSPG2, heparan sulfate	13130	GATTCTCCTC [G/A] GGCATCACAG	S	G	A	S	S
G4080u2	WIAF-14150	HT1396		HSPG2, heparan sulfate	10340	TTGAGTTCCA [C/T] TGTGCTGTGC	S	C	T	H	H
G4080u3	WIAF-14151	HT1396		HSPG2, heparan sulfate	12392	AATGCTATGA [T/C] AGCTCCCAT	S	T	C	D	D
G4080u4	WIAF-14152	HT1396		HSPG2, heparan sulfate	3416	TGGCTGTGCC [C/T] GAGGAAACCG	S	C	T	P	P
G4080u5	WIAF-14154	HT1396		HSPG2, heparan sulfate	4588	GTGCCGCTGG [T/C] GGGCAGCATC	M	T	C	V	A
G4080u6	WIAF-14156	HT1396		HSPG2, heparan sulfate	9582	GGACAGCCAC [G/A] CGGTGCTGCA	M	G	A	A	T
G4096u1	WIAF-13890	HT4237		394 motor protein	455	CAAGAAATC [G/A] ATTGAGTCGG	S	G	A	S	S
G4096u2	WIAF-13910	HT4237		455 motor protein	1150	ATCTAAACAG [C/T] CTGCTCACA	M	C	T	P	S
G4096u3	WIAF-13911	HT4237		1150 motor protein	1238	CTAAGGTTGT [A/G] TCTCAGTATC	S	A	G	V	V
G4109u1	WIAF-14034	HT28223		phosphoglucomutase-related protein	1043	TACAGCGTGG [C/T] GAAGACGGAT	M	C	T	A	V
G4109u2	WIAF-14035	HT28223		phosphoglucomutase-related protein	374	ATTATTGCTG [C/A] CCGGAAGCAG	M	C	A	A	D
G4112u1	WIAF-13615	HT4401		KIF5A, kinesin family member 5A	2767	AGATGTCCTT [G/A] CTGGCTACAA	M	G	A	A	T
G4112u2	WIAF-13623	HT4401		KIF5A, kinesin family member 5A		AGAGAGTTAA [G/T] GCCCTGAGG	M	G	T	K	N

G4114u1	WIAP-14113	HT4160	830 fibrinogen-like protein pT49	AACCTCACCA [G/A] AACATGGCAA	M	G	A	R	K
G4118u1	WIAP-14010	HT0841	MYL5, myosin, light polypeptide 5, regulatory	TCGATGTGGC [G/A] GGCAACCTGG	S	G	A	A	A
G4118u2	WIAP-14011	HT0841	MYL5, myosin, light polypeptide 5, regulatory	TTACCATGT [T/C] TCTGAACCTG	M	T	C	F	S
G4118u3	WIAP-14012	HT0841	MYL5, myosin, light polypeptide 5, regulatory	GAGGTGGACC [A/G] GATGTTCAG	M	A	G	Q	R
G4122u1	WIAP-13955	HT97538	161 myosin-I	TCGAGAACCT [A/G] CGGGGGGAT	S	A	G	L	L
G4124u1	WIAP-13895	HT0925	TGM3, transglutaminase 3 (E polypeptide, protein-glutamine-gamma-glutamyltransferase)	TCGCTGGCAT [G/A] CTGGCAGTAG	M	G	A	M	I
G4124u2	WIAP-13896	HT0925	TGM3, transglutaminase 3 (E polypeptide, protein-glutamine-gamma-glutamyltransferase)	AACCCAAACAC [G/A] CCATTTGCCG	S	G	A	T	T
G4126u1	WIAP-13830	HT2465	1039 myosin binding protein H	ACTCGTACTC [C/G] TTCGGGTCT	S	C	G	S	S
G4126u2	WIAP-13853	HT2465	369 myosin binding protein H	AGAGAGGGAG [G/C] CTCGGAGTGG	M	G	C	G	A
G4130u1	WIAP-13614	HT1657	198 CFL1, cofilin 1 (non-muscle)	CTGTGACGCA [T/C] CCCTACGCCA	S	T	C	D	D
G4138u1	WIAP-13598	HT33664	MAGP2: Microfibril-associated glycoprotein-2	GAAAGATGAG [C/T] TTTGCCGTCA	M	C	T	L	F
G4138u2	WIAP-13599	HT33664	MAGP2: Microfibril-associated glycoprotein-2	ATGACTTGGC [C/T] TCCCTCAGTG	S	C	T	A	A
G4138u3	WIAP-13600	HT33664	MAGP2: Microfibril-associated glycoprotein-2	AAGATCCTAA [T/C] CTGGTGAATG	S	T	C	N	N
G4159u1	WIAP-14048	HT3443	SNL, singed (Drosophila)-like (sea urchin fascin homolog like)	GCTGCTACTT [T/C] GACATCGAGT	S	T	C	F	F
G4170u1	WIAP-13580	HT5069	Golgi protein, peripherin, brefeldin A-sensitive	GAAATATACC [A/G] TAAGTATGGA	M	A	G	I	V
G4170u2	WIAP-13581	HT5069	Golgi protein, peripherin, brefeldin A-sensitive	GTATAATAAA [C/T] TCCTGGAGTT	M	C	T	L	F
G4170u3	WIAP-13582	HT5069	Golgi protein, peripherin, brefeldin A-sensitive	AGCAGCCTTA [A/G] GCATCTTTGGA	N	A	G	*	*
G4170u4	WIAP-13596	HT5069	Golgi protein, peripherin, brefeldin A-sensitive	TCACCAAGCT [T/G] TCTGTGCCTT	S	T	G	L	L

G4170u5	WIAF-13597	HT5069	1007	Golgi protein, peripheral, brefeldin A-sensitive	AAAAGGCAA [T/A] ACTGTTCCCTG	M	T	A	N	K
G4171u1	WIAF-13688	HT1587	667	KIF5B, kinesin family member 5B	TTTAAATTA [T/C] ATTTACTCCA	S	T	C	Y	Y
G4171u2	WIAF-13689	HT1587	1036	KIF5B, kinesin family member 5B	TTAGTAAAC [T/C] GGAGCTGAAG	S	T	C	T	T
G4176u1	WIAF-14204	HT33754	130	TNR, tenascin R (restrictin, janusin)	GCTCANTGGC [G/A] TCACCTGAT	M	G	A	V	I
G4176u2	WIAF-14205	HT33754	463	TNR, tenascin R (restrictin, janusin)	CTGTCCATGT [G/T] CCAGTTCAGC	M	G	T	A	S
G4176u3	WIAF-14206	HT33754	249	TNR, tenascin R (restrictin, janusin)	ACTACAACAC [G/A] TCCAGCAAAG	S	G	A	T	T
G4176u4	WIAF-14208	HT33754	2009	TNR, tenascin R (restrictin, janusin)	CTGGTCCCCA [G/A] GGGCATTGGT	M	G	A	R	K
G4176u5	WIAF-14209	HT33754	2175	TNR, tenascin R (restrictin, janusin)	CAGCCTCCTC [G/A] GAGACCTCCA	S	G	A	S	S
G4176u6	WIAF-14210	HT33754	3318	TNR, tenascin R (restrictin, janusin)	AATCCACCGA [C/T] GGAAGCCGCA	S	C	T	D	D
G4176u7	WIAF-14211	HT33754	3221	TNR, tenascin R (restrictin, janusin)	CCGGCAAAAC [T/C] GACAGCCAGT	M	T	C	L	P
G4176u8	WIAF-14217	HT33754	1635	TNR, tenascin R (restrictin, janusin)	TCTCGGACAC [C/T] GTGGCTTTTG	S	C	T	T	T
G4178u1	WIAF-14138	HT0224	2827	ACTN2, actinin, alpha 2	GCTGCGTTCT [C/T] TTCCGCACTC	M	C	T	S	F
G4178u2	WIAF-14139	HT0224	2818	ACTN2, actinin, alpha 2	CTGGATTACG [C/T] TGGGTTCTCT	M	C	T	A	V
G418u1	WIAF-11750	L07594	2370	TGFB3, transforming growth factor, beta receptor III (betaglycan, 300kD)	GAGTGCACTT [C/T] CCTATCCGCG	S	C	T	F	P
G418u2	WIAF-11751	L07594	2586	TGFB3, transforming growth factor, beta receptor III (betaglycan, 300kD)	AGAAGACGTT [C/T] ACCAAGCCCC	S	C	T	F	P
G418u3	WIAF-11752	L07594	2671	TGFB3, transforming growth factor, beta receptor III (betaglycan, 300kD)	AATTTCTCCA [C/T] CAATTTTCCA	M	C	T	P	S

G418u4	WIAF-11771	L07594		438	TGFB $\beta$ 3, transforming growth factor, beta receptor III (betaglycan, 300kD)	TGTTGAAGT [G/T] TCACCTGTCA	S	G	T	L	L
G418u5	WIAF-11744	L07594		392	TGFB $\beta$ 3, transforming growth factor, beta receptor III (betaglycan, 300kD)	CTGATGAGCT [T/C] CTGTTTAGCC	M	T	C	F	S
G418u6	WIAF-11772	L07594		1470	TGFB $\beta$ 3, transforming growth factor, beta receptor III (betaglycan, 300kD)	AGCTACGGAT [C/T] CTGCTGGACC	S	C	T	I	I
G418u7	WIAF-11773	L07594		1170	TGFB $\beta$ 3, transforming growth factor, beta receptor III (betaglycan, 300kD)	TCTTGAAGTG [C/A] AAAAAATCTG	N	C	A	C	*
G418u8	WIAF-11745	L07594		1463	TGFB $\beta$ 3, transforming growth factor, beta receptor III (betaglycan, 300kD)	CCTCTGAGC [T/C] ACGGATCCTG	M	T	C	L	P
G418u9	WIAF-11746	L07594		2211	TGFB $\beta$ 3, transforming growth factor, beta receptor III (betaglycan, 300kD)	ATGTTGAGGT [A/G] TCTGTACTA	S	A	G	V	V
G418lu1	WIAF-14207	HT2008		425	SPTBN1, spectrin, beta, non-erythrocytic 1	CTCTGCGCG [C/T] TTTTGTAGCG	M	C	T	L	F
G418lu2	WIAF-14213	HT2008		3565	SPTBN1, spectrin, beta, non-erythrocytic 1	AGACAGCGAT [C/T] GCCTCGGAGG	S	C	T	I	I
G418lu3	WIAF-14218	HT2008		1258	SPTBN1, spectrin, beta, non-erythrocytic 1	ACCTTCTGGA [A/G] TGGATTGAAC	S	A	G	E	E
G418lu4	WIAF-14219	HT2008		1780	SPTBN1, spectrin, beta, non-erythrocytic 1	AGCTCGAGG [C/T] GAGAATTACC	S	C	T	A	A
G418lu5	WIAF-14220	HT2008		3637	SPTBN1, spectrin, beta, non-erythrocytic 1	ACATCAAGAA [T/C] GAGATCGACA	S	T	C	N	N
G418lu1	WIAF-13976	HT2640		404	TPM4, tropomyosin 4	CCAAGCACAT [T/C] GCGGAAGAGG	S	T	C	I	I
G4185u1	WIAF-13554	HT3451		257	MFAP1, microfibrillar-associated protein 1	AAGCCAGAC [T/G] ATGCCCTTAT	M	T	G	Y	D
G4185u2	WIAF-13555	HT3451		1108	MFAP1, microfibrillar-associated protein 1	CCAACAAGC [T/G] GTTAAGGGCA	S	T	G	A	A

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G4185u3	WIAP-13570	HT3451	MPAP1, microfilament-associated protein 1	274	CTATGGAGTC [C/T] TCAGATAGG	S	C	T	S	S
G4196u1	WIAP-13665	HT97558	941 NUP88, nucleoporin 88kD	941	GGGTCCATTG [C/A] CCATGCATCT	M	C	A	A	D
G4196u2	WIAP-13666	HT97558	1092 NUP88, nucleoporin 88kD	1092	ATGACACAC [G/A] TCAGAAAGT	S	G	A	T	T
G4196u3	WIAP-13667	HT97558	1551 NUP88, nucleoporin 88kD	1551	TCCATCCAGC [G/A] TCCTCCCTCC	S	G	A	A	A
G4196u4	WIAP-13668	HT97558	2220 NUP88, nucleoporin 88kD	2220	AGGTGAACA [T/C] ATAAGGAAA	S	T	C	H	H
G4208u1	WIAP-13669	HT97558	2205 NUP88, nucleoporin 88kD	2205	CCATCTCTAAA [G/C] AAGAGATGA	S	A	G	K	K
G4208u2	WIAP-13921	HT1122	1329 VCL, vinculin	1329	TGATCTCTAAA [G/C] AAGAGATGA	M	G	C	E	Q
G4208u3	WIAP-13922	HT1122	2438 VCL, vinculin	2438	CCATCTCTAAA [G/C] AAGAGATGA	S	A	G	P	P
G4213u1	WIAP-13941	HT1122	818 VCL, vinculin	818	GGATGAGAG [T/C] GCCTGGGCCA	S	T	C	D	D
G4213u2	WIAP-13942	HT1122	1556 VCL, vinculin	1556	AAGCACAGC [G/A] TGGATTGATA	S	G	A	R	R
G4213u3	WIAP-13605	HT2813	163 NUP153, nucleoporin 153kD	163	GCCAGGTGG [T/C] TACAAAGATA	S	T	C	L	L
G4213u4	WIAP-13606	HT2813	742 NUP153, nucleoporin 153kD	742	GAATCTCTGA [A/G] TCCTTAAAC	M	A	G	I	V
G4213u5	WIAP-13609	HT2813	1800 NUP153, nucleoporin 153kD	1800	TTAGACTGCG [A/C] GAAATCTGTA	S	A	C	A	A
G4213u6	WIAP-13627	HT2813	1829 NUP153, nucleoporin 153kD	1829	AGTGTCTTAG [A/C] TATCTGAAA	M	A	C	D	A
G4213u7	WIAP-13632	HT2813	3258 NUP153, nucleoporin 153kD	3258	CTTTGGCAA [C/T] GTGGAGCCTG	S	C	T	N	N
G4218u1	WIAP-13635	HT2813	4162 NUP153, nucleoporin 153kD	4162	CTCTGAACA [A/G] CTCCTAATTC	M	A	G	T	A
G4223u1	WIAP-13854	HT1681	phosphatidyl-inositol glycan, class A	1122	AACCTTATTA [T/C] TTTATGTGAG	M	T	C	I	T
G4223u2	WIAP-14160	HT1684	CD36L2, CD36 antigen (collagen type I receptor, thrombospondin receptor)-like 2 (lysosomal integral membrane protein II)	1434	ATTAGATGAC [T/C] TTGTTGAAAC	M	T	C	F	L
G4223u3	WIAP-14173	HT1684	CD36L2, CD36 antigen (collagen type I receptor, thrombospondin receptor)-like 2 (lysosomal integral membrane protein II)	696	GTGGTCCAG [G/A] TGCACCTTCT	M	G	A	V	M
G4223u4	WIAP-14176	HT1684	CD36L2, CD36 antigen (collagen type I receptor, thrombospondin receptor)-like 2 (lysosomal integral membrane protein II)	986	CAGACAACTG [C/T] AATATGATTA	S	C	T	C	C
G4223u5	WIAP-14176	HT1684	CD36L2, CD36 antigen (collagen type I receptor, thrombospondin receptor)-like 2 (lysosomal integral membrane protein II)	1437	AGATGACCTTT [G/A] TTGAAACGGG	M	G	A	V	I

G4227u1	WIAF-14056	HT1929	912	proteoglycan 2	ATGCTCTCAA [G/A] AAAGATGGG	S	G	A	K	K
G4227u2	WIAF-14057	HT1929	1254	proteoglycan 2	GGAACCTTGC [G/A] TACTGGCTG	S	G	A	A	A
G4227u3	WIAF-14058	HT1929	1321	proteoglycan 2	CCGAGGAGGC [T/C] ACTGGCTG	M	T	C	Y	H
G4229u1	WIAF-13961	HT1689	74	SDC4, syndecan 4 (amphiglycan, ryudocan)	GCTGCTGCTG [T/C] TCTTGTAGG	M	T	C	F	L
G4230u1	WIAF-13525	HT4995	602	TRAM protein	CCATAACCTG [A/C] TGACATTTCA	M	A	C	M	L
G4243u1	WIAF-14169	HT2901	406	KRT17, keratin 17	AGCTGGAGGT [G/A] AAGATCCGTG	S	G	A	V	V
G4243u2	WIAF-14170	HT2901	478	KRT17, keratin 17	ACAGACAAAT [T/C] GAGGAGCTGC	S	T	C	I	I
G4243u3	WIAF-14171	HT2901	389	KRT17, keratin 17	GGAGGAGGCC [A/G] ACACCTGAGCT	M	A	G	N	D
G4243u4	WIAF-14178	HT2901	564	KRT17, keratin 17	CTGGCTGCTG [A/C] TGACTTCCGC	M	A	C	D	A
G4244u1	WIAF-14086	HT1056	386	clathrin, light polypeptide a	ATCGATTGCA [G/C] TCAGAGCCCTG	M	G	C	Q	H
G4246u1	WIAF-14044	HT97492	259	SLN, sarcophilin	GTCTATCAG [T/C] ACTGAGAGGC	M	T	C	Y	H
G4246u2	WIAF-14045	HT97492	189	SLN, sarcophilin	ACACCCGGGA [G/A] CTGTTTCTCA	S	G	A	E	E
G4254u1	WIAF-13546	HT3393	86	TNNI2, troponin I, skeletal, fast	ACCTGAAGAG [C/T] GTGATGCTGC	S	C	T	S	S
G4254u2	WIAF-13553	HT3393	530	TNNI2, troponin I, skeletal, fast	TCGAGGAGAA [G/C] TCTGGCATGG	M	G	C	K	N
G4255u1	WIAF-13644	HT2907	562	CRYAB, crystallin, alpha B	AGTTCACAG [G/A] AAATACCGGA	S	G	A	R	R
G4255u2	WIAF-13645	HT2907	367	CRYAB, crystallin, alpha B	CCTCCTTCT [G/A] CGGGCACCCA	S	G	A	L	L
G4255u3	WIAF-13872	HT2907	271	CRYAB, crystallin, alpha B	CCAGCGGCT [C/T] TTTGACCAGT	S	C	T	L	L
G4255u4	WIAF-13873	HT2907	580	CRYAB, crystallin, alpha B	GGATCCCAGC [T/C] GATGTAGACC	S	T	C	A	A
G4257u1	WIAF-14052	HT1694	394	PIGF, phosphatidylinositol glycan, class F	TAGAGTTGGC [A/G] TTGGAACAT	S	A	G	A	A
G4257u2	WIAF-14053	HT1694	252	PIGF, phosphatidylinositol glycan, class F	TATTTAGTAG [T/C] GAAACCAAAT	M	T	C	V	A
G4257u3	WIAF-14069	HT1694	291	PIGF, phosphatidylinositol glycan, class F	TCATTATCAC [A/G] CAAGGTAACT	M	A	G	H	R
G4264u1	WIAF-13519	HT0968	1720	TJPI, tight junction protein 1 (zona occludens 1)	CGGTCAGTGG [C/T] TTCCAGCCAG	M	C	T	A	V

G4264u2	WIAF-13520	HT0968		2272	TJPI, tight junction protein 1 (zona occludens 1)	CATGCTGATG [A/G] TCACACACCT	M	A	G	D	G
G4264u3	WIAF-13529	HT0968		5408	TJPI, tight junction protein 1 (zona occludens 1)	AGCCTCCTGA [A/T] GCTGATGGTG	M	A	T	B	D
G434u1	WIAF-11748	M21121		286	SCYAS, small inducible cytokine A5 (RANTES)	TACATCAACT [C/T] TTTGGAGATG	M	C	T	S	F
G434u2	WIAF-11749	M21121		137	SCYAS, small inducible cytokine A5 (RANTES)	GCTTGGCCTA [C/T] ATTGCCCGCC	S	C	T	Y	Y
G435u1	WIAF-11741	M31933		754	FCGR2B, Fc fragment of IgG, low affinity IIB, receptor for (CD32)	GTCACCTGGGA [T/C] TGCTGTAGCG	M	T	C	I	T
G435u2	WIAF-11743	M31933		395	FCGR2B, Fc fragment of IgG, low affinity IIB, receptor for (CD32)	GGGAGTACAC [G/A] TGCCAGACTG	S	G	A	T	T
G435u3	WIAF-11742	M31933		673	FCGR2B, Fc fragment of IgG, low affinity IIB, receptor for (CD32)	TACACGCTGT [T/A] CTCATCCAAG	M	T	A	F	Y
G4369u1	WIAF-13728	HT0900		1176	GBE1, glucan (1,4-alpha-), branching enzyme 1 (glycogen branching enzyme, Andersen disease, glycogen storage disease type IV)	TTACGTCCAT [G/A] CTTTATCATC	M	G	A	M	I
G4369u2	WIAF-13729	HT0900		1609	GBE1, glucan (1,4-alpha-), branching enzyme 1 (glycogen branching enzyme, Andersen disease, glycogen storage disease type IV)	GAGTGTCTCTG [A/G] CTCCTTTTAC	M	A	G	T	A
G4373u1	WIAF-13559	HT0940		1117	HSD17B2, hydroxysteroid (17-beta) dehydrogenase 2	GCCAGCAAGG [A/T] CTTCTCTCCG	M	A	T	D	V
G4373u2	WIAF-13560	HT0940		1195	HSD17B2, hydroxysteroid (17-beta) dehydrogenase 2	CCAGGGAAG [G/A] CGCTTACTTG	M	G	A	G	D
G438u1	WIAF-11830	M63121		583	TNFRSF1A, tumor necrosis factor receptor superfamily, member 1A	ACCGTGTGTG [G/A] CTGCAGGAAG	M	G	A	G	D



G438u2	WIAP-11790	M63121	618	TNFRSF1A, tumor necrosis factor receptor superfamily, member 1A	TTNTTGGAGT[G/A]AAAACCTTTT	M	G	A	S	K
G440u1	WIAP-11806	M74447	261	TAP2, transporter 2, ABC (ATP binding cassette)	TGCTAAAGCT[A/G]AGAGGGCTGC	S	A	G	L	L
G440u2	WIAP-11807	M74447	2089	TAP2, transporter 2, ABC (ATP binding cassette)	CAGGCTGCAG[G/A]CACTTCAGCG	M	G	A	A	T
G440u3	WIAP-11808	M74447	2155	TAP2, transporter 2, ABC (ATP binding cassette)	TGCCACGCTC[C/T]ACGAGGGACA	N	C	T	Q	*
G440u4	WIAP-11818	M74447	1789	TAP2, transporter 2, ABC (ATP binding cassette)	GAACAACATT[G/A]CTTATGGGCT	M	G	A	A	T
G440u5	WIAP-11819	M74447	1565	TAP2, transporter 2, ABC (ATP binding cassette)	AAGGGGCTGA[C/T]GTTTACCCTA	M	C	T	T	M
G440u6	WIAP-11820	M74447	1254	TAP2, transporter 2, ABC (ATP binding cassette)	TGCACCTTGGG[G/T]GTGCAGATGC	S	G	T	G	G
G440u7	WIAP-11788	M74447	1231	TAP2, transporter 2, ABC (ATP binding cassette)	GTACCTGCTC[A/G]TAAGGAGGGT	M	A	G	I	V
G440u8	WIAP-11821	M74447	1404	TAP2, transporter 2, ABC (ATP binding cassette)	TGCTCAGCAA[C/T]GTGGGAGCTG	S	C	T	N	N
G440u9	WIAP-11783	M74447	2187	TAP2, transporter 2, ABC (ATP binding cassette)	CCCGCTGGT[T/G]CAGCAGCGGC	S	T	G	V	V
G440u10	WIAP-11786	M74447	1825	TAP2, transporter 2, ABC (ATP binding cassette)	TGATAAGGTG[A/G]TGGCGGCTGC	M	A	G	M	V
G440u11	WIAP-14007	HT97396	839 A33		GCCAAATCAA[C/T]GAGGGCTCAC	M	G	T	K	N
G440u1	WIAP-14013	HT1215	109	ACP2, acid phosphatase 2, lysosomal	CCGCCACCC[G/A]GGCCCGGAGT	M	G	A	R	Q
G440u2	WIAP-14016	HT1215	1271	ACP2, acid phosphatase 2, lysosomal	ACCGCCACGT[C/T]GCAGATGGGG	S	C	T	V	V
G440u1	WIAP-13661	HT3564	872	ACPP, acid phosphatase, prostate	ACAAAAAACT[T/C]ATCATGTATT	S	T	C	L	L
G440u2	WIAP-13662	HT3564	839	ACPP, acid phosphatase, prostate	ATCACATGAA[G/A]AGAGCAACTC	S	G	A	K	K
G440u3	WIAP-13881	HT3564	741	ACPP, acid phosphatase, prostate	AGATTGTCA[G/T]AATTGTCCCT	N	G	T	E	*
G441u1	WIAP-10166	M77349	698	TGFBI, transforming growth factor, beta-induced, 68kD	GTGCCCGGCT[C/G]CTGAAGCCG	S	C	G	L	L

G441u2	WIAP-10168	M77349	1028	TGFBI, transforming growth factor, beta-induced, 68KD	GGCTGTCTGT [A/G] GAGACCCCTGG	S	A	G	V	V
G441u3	WIAP-10169	M77349	1667	TGFBI, transforming growth factor, beta-induced, 68KD	ACACAGTCTT [T/C] GCTCCCAAA	S	T	C	F	F
G441u4	WIAP-10171	M77349	1463	TGFBI, transforming growth factor, beta-induced, 68KD	GTAATAGCCT [C/T] TGCATTGAGA	S	C	T	L	L
G441u1	WIAP-14005	HT97468	492	acyl-CoA	GCTGACCAAT [A/G] AGGCCACCCT	M	A	G	K	B
G441u2	WIAP-14008	HT97468	1076	acyl-CoA	TGCCCGAGAC [C/T] GAGGACGAGA	S	C	T	T	T
G4412u1	WIAP-13576	HT1882	657	ACADS, acyl-Coenzyme A dehydrogenase, C-2 to C-3 short chain	GCAAAACAAG [G/A] GCATCAGTGC	M	G	A	G	S
G4412u2	WIAP-13579	HT1882	1022	ACADS, acyl-Coenzyme A dehydrogenase, C-2 to C-3 short chain	TGACCTGGCG [C/T] GCTGCCATGC	S	C	T	R	R
G4415u1	WIAP-14080	HT2503	2170	acyl-Coenzyme A:cholesterol acyltransferase	TCATTATATT [C/T] GAGCAGATTC	S	C	T	F	F
G4415u2	WIAP-14081	HT2503	1993	acyl-Coenzyme A:cholesterol acyltransferase	TTTCAGTTCC [C/T] TATTTTCTGT	S	C	T	P	P
G4415u3	WIAP-14098	HT2503	2006	acyl-Coenzyme A:cholesterol acyltransferase	TTTTCTGTTC [C/G] AACATTGGCG	M	C	G	Q	E
G4415u4	WIAP-14101	HT2503	2365	acyl-Coenzyme A:cholesterol acyltransferase	GGGTTATGT [C/T] GCTATGAAGT	S	C	T	V	V
G4417u1	WIAP-13819	HT0542	356	AOAH, acyloxyacyl hydrolase (neutrophil)	TCCAGCCCAAC [G/A] ATGACCAGTC	M	G	A	D	N
G4417u2	WIAP-13820	HT0542	340	AOAH, acyloxyacyl hydrolase (neutrophil)	TTCAGTCCTC [G/A] GCCCTCCAG	S	G	A	S	S
G4417u3	WIAP-13824	HT0542	1595	AOAH, acyloxyacyl hydrolase (neutrophil)	GCTAAATAAA [G/A] ACATGACCTA	M	G	A	D	N
G4417u4	WIAP-13841	HT0542	382	AOAH, acyloxyacyl hydrolase (neutrophil)	CCAGCCTCTC [G/A] AATGGGCACA	S	G	A	S	S
G4417u5	WIAP-13842	HT0542	458	AOAH, acyloxyacyl hydrolase (neutrophil)	CAACTCGACG [G/A] TCCAGGCCTC	M	G	A	V	I

G4417u6	WIAF-13843	HT0542	1201	AOAH, acyloxyacyl hydrolase (neutrophil)	GATTTCTGGA [C/T] TCCACTGTGTG	S	C	T	D	D
G4417u7	WIAF-13844	HT0542	1321	AOAH, acyloxyacyl hydrolase (neutrophil)	ACCTGAAGAA [A/G] TTTATAGAAA	S	A	G	K	K
G4417u8	WIAF-13845	HT0542	1404	AOAH, acyloxyacyl hydrolase (neutrophil)	GATGCTGCA [G/A] TGGGAAGAT	M	G	A	S	N
G4417u9	WIAF-13846	HT0542	1759	AOAH, acyloxyacyl hydrolase (neutrophil)	AATTTACAAA [C/T] TTCAATCTTT	S	C	T	N	N
G4417u10	WIAF-13847	HT0542	1644	AOAH, acyloxyacyl hydrolase (neutrophil)	CTCCAGGTCA [G/A] CCCCTGCCAC	M	G	A	S	N
G442u1	WIAF-11828	M94582	933	IL8RA, interleukin 8 receptor, alpha	CACATCGACC [G/A] GGCTCTGGAT	M	G	A	R	Q
G442u2	WIAF-11829	M94582	721	IL8RA, interleukin 8 receptor, alpha	TCTCTGTGCC [A/G] CTGCTGATCA	S	A	G	P	P
G442u3	WIAF-11780	M94582	1027	IL8RA, interleukin 8 receptor, alpha	GCCATGGACT [C/T] CTCAGATTTC	S	C	T	L	L
G442u4	WIAF-11792	M94582	78	IL8RA, interleukin 8 receptor, alpha	ATGGAGAGTG [A/G] CAGCTTTGAA	M	A	G	D	G
G4423u1	WIAF-13752	HT2216	71	ADSL, adenylosuccinate lyase	GCTATGCCAG [C/T] CCGGAGATGT	S	C	T	S	S
G4423u2	WIAF-13794	HT2216	126	ADSL, adenylosuccinate lyase	ATGGGGCAG [C/T] TGTGGCTGTG	S	C	T	L	L
G4423u3	WIAF-13795	HT2216	674	ADSL, adenylosuccinate lyase	AGCTTGACAA [G/A] ATGGTGACAG	S	G	A	K	K
G4428u1	WIAF-13954	HT97524	57	ADFP, adipose differentiation-related protein; adipophilin	TGCTCAACCT [G/A] CCTTGGTGA	S	G	A	L	L
G4434u1	WIAF-13506	HT0863	551	ARE3, ADP-ribosylation factor 3	TCTGGAGACA [C/T] TACTTCCAGA	S	C	T	H	H
G444u1	WIAF-10172	U28694	398	CCR3, chemokine (C-C motif) receptor 3	CGAGATCTTT [T/G] TCATAATCCT	M	T	G	F	V
G444u2	WIAF-10181	U28694	214	CCR3, chemokine (C-C motif) receptor 3	TCCTCATAAA [A/G] TACAGAGGC	S	A	G	K	K
G4440u1	WIAF-14054	HT1392	136	ADRBK1, adrenergic, beta, receptor kinase 1	GCAAGAGAT [A/C] CTGCTGCCCG	S	A	C	I	I
G445u1	WIAF-10183	U40373	319	Human cell surface glycoprotein CD44 mRNA, complete cds.	TAGAAGGGCA [C/T] GTGGTGATTC	S	C	T	H	H

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G4456u1	WIAP-113629	HT0626	796	ALDOC, aldolase C, fructose- biphosphate	CCCTGCTCAA [G/A]CCCAACATGG	S	G	A	K	K
G446u1	WIAP-11832	U64198	754	IL12RB2, interleukin 12 receptor, beta 2	TGAAGCCTTC [C/G]CATGTAATTT	S	C	G	S	S
G446u2	WIAP-11795	U64198	2559	IL12RB2, interleukin 12 receptor, beta 2	TTTTCTCAAC [G/A]CATTACTTCC	S	G	A	T	T
G446u3	WIAP-11833	U64198	2500	IL12RB2, interleukin 12 receptor, beta 2	TGCAAGGTAA [A/G]GCCAATTGGA	S	A	G	K	K
G446u4	WIAP-11835	U64198	1918	IL12RB2, interleukin 12 receptor, beta 2	CTCCTCGCCA [G/C]GTCTCTGCAA	M	G	C	Q	H
G446u5	WIAP-11793	U64198	991	IL12RB2, interleukin 12 receptor, beta 2	GTGAGACAGA [G/A]ATCTTCGTTG	S	G	A	E	E
G446u6	WIAP-11794	U64198	2459	IL12RB2, interleukin 12 receptor, beta 2	AGTTCCACAG [G/C]AAATGAGAGG	M	G	C	G	A
G446a7	WIAP-13128	U64198	1964	IL12RB2, interleukin 12 receptor, beta 2	GGTGACTTGG [C/G]AGCCTCCAG	M	C	G	Q	E
G446a8	WIAP-13129	U64198	2050	IL12RB2, interleukin 12 receptor, beta 2	TCTAAACTGG [C/G]TACGAGTGG	M	C	G	L	V
G447u1	WIAP-11796	X03663	384	CSF1R, colony stimulating factor 1 receptor, formerly McDonough feline sarcoma viral (v-fms) oncogene homolog	CCAGTGTCCC [C/T]GAGCTGGTGG	S	C	T	P	P
G447u2	WIAP-11836	X03663	1026	CSF1R, colony stimulating factor 1 receptor, formerly McDonough feline sarcoma viral (v-fms) oncogene homolog	ACAACAACAC [T/C]AAGCTCGCAA	S	T	C	T	T
G447u3	WIAP-11837	X03663	886	CSF1R, colony stimulating factor 1 receptor, formerly McDonough feline sarcoma viral (v-fms) oncogene homolog	GCTGAAAGTG [C/A]AGAAAGTCAT	M	C	A	Q	K
G447u4	WIAP-11797	X03663	2425	CSF1R, colony stimulating factor 1 receptor, formerly McDonough feline sarcoma viral (v-fms) oncogene homolog	GAAGAAATAT [G/A]TCCGACGGGA	M	G	A	V	I

G4473u1	WIAF-13904	HT1352	FUCAL, fucosidase, alpha-L-1, tissue	860	TTCAGGCCAC [A/G] GAGCTTGCCA	M	A	G	O	R
G4473u2	WIAF-13916	HT1352	FUCAL, fucosidase, alpha-L-1, tissue	440	ACAACTGGC [C/T] GAGCTCTGTG	M	C	T	P	L
G4479u1	WIAF-13637	HT1995	AMPD2, adenosine monophosphate deaminase 2 (isoform L)	2465	GCCTCAATGA [G/T] CCTGTCCAT	-	G	T	-	-
G4479u2	WIAF-13866	HT1995	AMPD2, adenosine monophosphate deaminase 2 (isoform L)	1258	TGGATGTGCA [T/C] GCGGACAGGA	S	T	C	H	H
G4479u3	WIAF-13867	HT1995	AMPD2, adenosine monophosphate deaminase 2 (isoform L)	1280	CACCTTCCAT [C/T] GCTTTGACAA	M	C	T	R	C
G4479u4	WIAF-13868	HT1995	AMPD2, adenosine monophosphate deaminase 2 (isoform L)	1201	TGCGGAGGT [C/T] TTTGAGAGCA	S	C	T	V	V
G4479u5	WIAF-13869	HT1995	AMPD2, adenosine monophosphate deaminase 2 (isoform L)	1579	GTACCAAGGG [C/T] CAGCTGGCCA	S	C	T	G	G
G4492u1	WIAF-14084	HT3390	ANX11, annexin XI (56kD autoantigen)	866	CCTGGGAGT [C/T] GCTCCAACAA	M	C	T	R	C
G4492u2	WIAF-14085	HT3390	ANX11, annexin XI (56kD autoantigen)	850	AGGCCATCAT [T/C] GACTGCTGG	S	T	C	I	I
G450u1	WIAF-10170	X85740	CCR4, chemokine (C-C motif) receptor 4	1196	TCCAAATTTA [C/T] TCTGCTGACA	S	C	T	Y	Y
G4502u1	WIAF-13510	HT4840	ASS, argininosuccinate synthetase	165	AAGCTATGA [C/T] GTCATTCCT	S	C	T	D	D
G4502u2	WIAF-13511	HT4840	ASS, argininosuccinate synthetase	369	GGCCCTGCAT [C/T] GCCCGCAAC	S	C	T	I	I
G4502u3	WIAF-13512	HT4840	ASS, argininosuccinate synthetase	73	AATCCCAGAC [G/A] CTATGTCCAG	-	G	A	-	-
G4502u4	WIAF-13513	HT4840	ASS, argininosuccinate synthetase	129	TGGACACCTC [G/C] TGCATCCTCG	S	G	C	S	S
G4502u5	WIAF-13514	HT4840	ASS, argininosuccinate synthetase	285	AGTTTGTGGA [G/A] GAGTTCATCT	S	G	A	E	E
G4502u6	WIAF-13515	HT4840	ASS, argininosuccinate synthetase	234	AGGCACTGAA [G/A] CTTGGGGCCA	S	G	A	K	K
G4502u7	WIAF-13516	HT4840	ASS, argininosuccinate synthetase	316	CCAGTCCAGC [G/A] CACTGTATGA	M	G	A	A	T

G4502u8	WIAP-13537	HT4840	426 ASS, argininosuccinate synthetase	TGTCACACGG[C/T]GCACAGGAA	S	C	T	G	G
G4502u9	WIAP-13538	HT4840	530 ASS, argininosuccinate synthetase	GAATTCTACA[A/G]CCGTTCAAG	M	A	G	N	S
G4502u10	WIAP-13539	HT4840	750 ASS, argininosuccinate synthetase	TTCTCGAGAT[C/T]GAGTTCAAAA	S	C	T	I	I
G4502u11	WIAP-13540	HT4840	960 ASS, argininosuccinate synthetase	ATGCTCATTT[A/G]GACATCGAGG	S	A	G	L	L
G4508u1	WIAP-13563	HT28557	1767 ARSD, arylsulphatase D	CAGTTTTCCTCA[T/C]GAGCAACATC	M	T	C	M	T
G4508u2	WIAP-13693	HT28557	433 ARSD, arylsulphatase D	TTCAAGTGGA[A/C/T]GCAGGCTCAG	S	C	T	N	N
G4508u3	WIAP-13694	HT28557	747 ARSD, arylsulphatase D	GGTTTCTTCT[C/G]TGCTCTCGCG	M	C	G	S	C
G4508u4	WIAP-13696	HT28557	1012 ARSD, arylsulphatase D	CCACGAGTGC[A/G]TTCCTGGGA	S	A	G	A	A
G4508u5	WIAP-13697	HT28557	1302 ARSD, arylsulphatase D	CGAGTGATTG[G/A]AGAGCCOACG	M	G	A	G	E
G4508u6	WIAP-13698	HT28557	1285 ARSD, arylsulphatase D	GGTGCTCCC[G/A]GCCGGCCGAG	S	G	A	P	P
G4508u7	WIAP-13699	HT28557	1807 ARSD, arylsulphatase D	AGCCGTGCTG[C/T]GGACATTTC	S	C	T	C	C
G4508u8	WIAP-13718	HT28557	483 ARSD, arylsulphatase D	GCAAGAAATCT[T/C]GCAGCAGCAT	M	T	C	L	S
G4518u1	WIAP-13809	HT3430	ASPA, aspartoacylase 515 (aminoacylase 2, Canavan disease)	ACAACACCAC[C/T]TCTAATCTGG	S	C	T	T	T
G4518u2	WIAP-13810	HT3430	ASPA, aspartoacylase 851 (aminoacylase 2, Canavan disease)	AAGTTGATTA[C/T]CCCCGGGATG	S	C	T	Y	Y
G4518u3	WIAP-13811	HT3430	ASPA, aspartoacylase 787 (aminoacylase 2, Canavan disease)	CATCATTTCA[A/G]TGAAGGAAAA	M	A	G	N	S
G4518u4	WIAP-13837	HT3430	ASPA, aspartoacylase 618 (aminoacylase 2, Canavan disease)	ACCTGTCTAC[G/A]TTTATCTGAT	M	G	A	V	I
G452a1	WIAP-10509	HT0695	553 APOA4, apolipoprotein A-IV	ACCAGGTCA[A/G]CAGCAGGCC	M	A	G	N	S
G452a2	WIAP-13124	HT0695	563 APOA4, apolipoprotein A-IV	ACACGAGGC[C/T]GAGCAGCTGC	S	C	T	A	A
G452a1	WIAP-14120	HT1541	726 ATP5A1, ATP synthase, H+ transporting, mitochondrial F1 complex, alpha subunit, isoform 1, cardiac muscle	CTCAATTGCT[A/G]TTGACACAAT	M	A	G	I	V

G4524u2	WIAF-14131	HT1541		153	ATP5A1, ATP synthase, H <sup>+</sup> transporting, mitochondrial F1 complex, alpha subunit, isoform 1, cardiac muscle	ATCTTTCATT [G/T] CTGCAAGGAA	M	G	T	A	S
G4526u1	WIAF-14130	HT4994		400	ATP5D, ATP synthase, H <sup>+</sup> transporting, mitochondrial F1 complex, delta subunit	TCCATGCGCAG [T/C] GAACGCCGAC	M	T	C	V	A
G453u1	WIAF-10138	HT0768		1747	PDGFRB, platelet-derived growth factor receptor, beta polypeptide	CTGCCGCCCA [C/T] GCTGCTGGGG	M	C	T	T	M
G453u2	WIAF-10147	HT0768		2957	PDGFRB, platelet-derived growth factor receptor, beta polypeptide	TTTTGCCTTT [A/G] AAGTGGATGG	S	A	G	L	L
G453u3	WIAF-10148	HT0768		3608	PDGFRB, platelet-derived growth factor receptor, beta polypeptide	AGCCGGAGCC [A/G] GAGCTGGAAC	S	A	G	P	P
G453u4	WIAF-10149	HT0768		457	PDGFRB, platelet-derived growth factor receptor, beta polypeptide	CAGGCGCTGG [T/G] CGTCACACCC	M	T	G	V	G
G453u5	WIAF-10151	HT0768		1505	PDGFRB, platelet-derived growth factor receptor, beta polypeptide	AGCTGACACT [G/C] GTTCGCGTGA	S	G	C	L	L
G453u6	WIAF-10153	HT0768		3446	PDGFRB, platelet-derived growth factor receptor, beta polypeptide	ACCCCAAACC [C/T] GAGGTTGCTG	S	C	T	P	P
G453u7	WIAF-10161	HT0768		2030	PDGFRB, platelet-derived growth factor receptor, beta polypeptide	TTTGGCAGAA [G/A] AAGCCACGTT	S	G	A	K	K
G4533u1	WIAF-13616	HT1618		343	ATP synthase, H <sup>+</sup> transporting, subunit D, vacuolar	GTTACATGAT [C/T] GACAACTGA	S	C	T	I	I
G4534u1	WIAF-13569	HT3556		654	ATP6E, ATPase, H <sup>+</sup> transporting, lysosomal (vacuolar proton pump) 31kD	TAAAGTTTC [C/T] AACACCCTGG	S	C	T	S	S

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G4535u1	WIAP-13747	HT27972		ATP50, ATP synthase, H <sup>+</sup> transporting, mitochondrial F1 complex, O subunit (oligomycin sensitivity conferring protein)	357		TCACTACCAA[C/T]CTGATCAATT	S	C	T	N	N
G4535u2	WIAP-13748	HT27972		ATP50, ATP synthase, H <sup>+</sup> transporting, mitochondrial F1 complex, O subunit (oligomycin sensitivity conferring protein)	144		AGGTATACGG[T/C]ATTGAAGTTC	S	T	C	G	G
G4535u3	WIAP-13792	HT27972		ATP50, ATP synthase, H <sup>+</sup> transporting, mitochondrial F1 complex, O subunit (oligomycin sensitivity conferring protein)	329		ATCACAGCAA[A/G]AGAGAGGTTC	M	A	G	K	R
G4539u1	WIAP-13711	HT48520		ATPase, 14 kDa subunit, vacuolar ATPase, Ca <sup>2+</sup> transporting, plasma membrane, isoform 2	288		TGCCCTGGAC[G/A]CCACCCAGCA	M	G	A	A	T
G4548u1	WIAP-14127	HT1574		ATPase, Ca <sup>2+</sup> transporting, plasma membrane, isoform 2	3138		CGCAATGTCT[T/C]TGACGGCATC	M	T	C	F	S
G4548u2	WIAP-14137	HT1574		ATPase, Ca <sup>2+</sup> transporting, plasma membrane, isoform 2	2089		GCACTATCTG[C/T]GTGGCTACC	S	C	T	C	C
G4548u3	WIAP-14140	HT1574		ATPase, Ca <sup>2+</sup> transporting, plasma membrane, isoform 2	2924		CAGGACCATG[A/T]TGAAGAACAT	M	A	T	M	L
G4549u1	WIAP-14161	HT1346		ATP2B4, ATPase, Ca <sup>++</sup> transporting, plasma membrane 4	524		TGCACTGACC[C/T]AGATTAAATGT	N	C	T	Q	*
G4549u2	WIAP-14162	HT1346		ATP2B4, ATPase, Ca <sup>++</sup> transporting, plasma membrane 4	715		ATGTACAGCT[C/T]ATCATCTCTGG	S	C	T	L	L
G4549u3	WIAP-14163	HT1346		ATP2B4, ATPase, Ca <sup>++</sup> transporting, plasma membrane 4	508		AGCTGCGTTC[G/A]AGGGATGCAC	S	G	A	S	S
G4549u4	WIAP-14166	HT1346		ATP2B4, ATPase, Ca <sup>++</sup> transporting, plasma membrane 4	1084		TGATCCAAGG[G/A]AATGATCTGA	S	G	A	G	G



G4552u1	WIAP-13630	HT0867		ATP7A, ATPase, Cu++ transporting, alpha polypeptide (Menkes syndrome)	710	TACTAGCACT [A/G] TTGAAGGAAA	M	A	G	I	V
G456u1	WIAP-10074	HT2834		EDN1, endothelin 1	408	CCTGGCGGCT [T/G] CGCGGCTCCA	S	T	G	L	L
G456u2	WIAP-10075	HT2834		EDN1, endothelin 1	585	CAGACCGTGA [A/G] AATAGATGCC	S	A	G	E	E
G456a3	WIAP-10507	HT2834		EDN1, endothelin 1	861	TGAAGGCAA [T/G] CCTCCAGAG	M	T	G	K	N
G4565u1	WIAP-14041	HT28561		ATP1G1, ATPase, Na+/K+ transporting, gamma 1 polypeptide	320	CGAGGCTGCT [G/A] TTACGGCTCA	S	G	A	L	L
G4565u2	WIAP-14062	HT28561		ATP1G1, ATPase, Na+/K+ transporting, gamma 1 polypeptide	216	CAGTGACGGG [G/A] ACNAAAGTCT	M	G	A	D	N
G4565u3	WIAP-14063	HT28561		ATP1G1, ATPase, Na+/K+ transporting, gamma 1 polypeptide	315	ACGCGGAGG [C/A] TGCTGTACG	M	C	A	L	M
G4565u4	WIAP-14064	HT28561		ATP1G1, ATPase, Na+/K+ transporting, gamma 1 polypeptide	531	TTTCCCCAGG [T/C] GAATGGGCTG	N	T	C	A	R
G4568u1	WIAP-14212	HT0082		AMFR, autocrine motility factor receptor	717	TGCTCTCATGC [A/G] TACGTCCCAC	M	A	G	I	V
G457a1	WIAP-10489	HT2903		SELL, selectin L (lymphocyte adhesion molecule 1)	321	ACAAATCTCT [C/T] ACTGAGAAG	S	C	T	L	L
G457a2	WIAP-10490	HT2903		SELL, selectin L (lymphocyte adhesion molecule 1)	577	CCAGTGTGAG [T/C] TTGTGATTCA	M	T	C	F	L
G457a3	WIAP-10491	HT2903		SELL, selectin L (lymphocyte adhesion molecule 1)	601	TGAGCCTTTG [G/C] AGCCCCCAGA	M	G	C	E	Q
G457a4	WIAP-10492	HT2903		SELL, selectin L (lymphocyte adhesion molecule 1)	637	CTGTACTCAC [C/T] CTTTGGGAAA	M	C	T	P	S
G4573u1	WIAP-13568	HT28320		MGAT2, mannosyl (alpha-1,6-)-glycoprotein beta-1,2-N-acetylglucosaminyltransferase	943	CGGACAACT [G/T] ACGCTGCGGT	S	G	T	L	L

G4574u1	WIAF-13805	HT0198	163	beta-1,4 N-acetylglucosaminyltransferase	CGGCCTCCGG [C/G]TACCTCTTGC	M	C	G	L	V
G4574u2	WIAF-13806	HT0198	415	beta-1,4 N-acetylglucosaminyltransferase	TCCCAACAAG [G/A]AGCAGAGTT	M	G	A	E	K
G4574u3	WIAF-13807	HT0198	726	beta-1,4 N-acetylglucosaminyltransferase	AACTACAAC [G/T]GTCACCTTACA	S	G	T	L	L
G4574u4	WIAF-13836	HT0198	559	beta-1,4 N-acetylglucosaminyltransferase	AGGGCTGAGC [C/A]TTCAGGCAGC	M	C	A	L	I
G4575u1	WIAF-13626	HT0341	1251	GCNT1, glucosaminyl (N-acetyl) transferase 1, core 2 (beta-1,6-N-acetylglucosaminyltransferase)	AGTATGATCT [A/G]TCTGACATGC	S	A	G	L	L
G4577u1	WIAF-13971	HT1495	1268	SIAT1, sialyltransferase 1 (beta-galactoside alpha-2,6-sialyltransferase)	ATTCTTTAA [C/T]AACTACAAGA	S	C	T	N	N
G458u1	WIAF-10063	HT2968	1464	ALB, albumin	GTGCAGAGA [C/A]TATCTATCCG	M	C	A	D	E
G458u2	WIAF-10089	HT2968	1470	ALB, albumin	AAGACTATCT [A/C]TCCGTGGTCC	S	A	C	L	L
G458u3	WIAF-10091	HT2968	1707	ALB, albumin	TGTTTGAGCT [C/T]GTGAAACACA	S	C	T	L	L
G458a4	WIAF-10504	HT2968	889	ALB, albumin	CAGGGCGGAC [C/T]TTGCCAAGTA	M	C	T	L	F
G458a5	WIAF-10508	HT2968	1475	ALB, albumin	TATCTATCCG [T/A]GGTCTGAAC	M	T	A	V	E
G458a6	WIAF-12091	HT2968	1330	ALB, albumin	CCAGATGCG [C/T]TATTAGTTTCG	S	C	T	L	L
G458a7	WIAF-12092	HT2968	1408	ALB, albumin	CCTAGGAAA [G/a]TGGGACGCA	M	G	a	V	M
G4592u1	WIAF-14126	HT2128	985	branched-chain keto acid dehydrogenase E1, alpha polypeptide	ACCAGCCCTT [T/C]CTCATCGAGG	S	T	C	F	F
G4593u1	WIAF-13574	HT97373	1743	domain 1, BARD1, BRCA1 associated RING	GCTAGCCACT [G/C]CTCAGTAATG	M	G	C	C	S
G4593u2	WIAF-13592	HT97373	1167	domain 1, BARD1, BRCA1 associated RING	TGTTCTTCAC [C/T]ACCTTCATGC	M	C	T	P	L
G4593u3	WIAF-13593	HT97373	1591	domain 1, BARD1, BRCA1 associated RING	AGAAAGGCA [C/T]GTGGATATAG	S	C	T	H	H
G4593u4	WIAF-13594	HT97373	2030	domain 1, BARD1, BRCA1 associated RING	AAAGTATGAA [A/G]TTCCTGAAGG	M	A	G	I	V

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G4593u5	WIAF-13595	HT97373	2006	BARD1, BRC1 associated RING domain 1	AAGAAAAGTA [T/C]GTGAACAGGA	M	T	C	C	R
G4599u1	WIAF-13920	HT4273	1803	CDH13, cadherin 13, H-cadherin (heart)	TCGTACCCGA [C/T]GTCTCTCAGG	S	C	T	D	D
G4614u1	WIAF-13733	HT4835	91	S100A3, S100 calcium-binding protein A3	AGGATGGCCA [G/A]CCCTCTGGAG	M	G	A	R	K
G4614u2	WIAF-13734	HT4835	203	S100A3, S100 calcium-binding protein A3	TGCTGCAGAA [G/A]GAGCTGGCCA	S	G	A	K	K
G4614u3	WIAF-13769	HT4835	344	S100A3, S100 calcium-binding protein A3	TCTACTGCCA [C/T]GAGTACTTCA	S	C	T	H	H
G462u1	WIAF-10134	HT4753	600	PDGFA, platelet-derived growth factor alpha polypeptide	ACGGGTCCA [C/T]GCCACTAAGC	S	C	T	H	H
G4627u1	WIAF-14042	HT0771	186	ANX6, annexin VI (p68)	GGAGCCNTA [C/T]TGGACATAAT	S	C	T	L	L
G4627u2	WIAF-14043	HT0771	1664	ANX6, annexin VI (p68)	CAGACACACC [T/C]AGTGGAGACA	S	T	C	P	P
G4627u3	WIAF-14067	HT0771	1498	ANX6, annexin VI (p68)	AAGGAGGACT [A/G]TCACAAGTCC	M	A	G	Y	C
G4644u1	WIAF-13801	HT1736	1990	CPS1, carbamoyl-phosphate synthetase 1, mitochondrial	TGGTGGAGAA [G/A]TCAGTGACAG	S	G	A	K	K
G4644u2	WIAF-13802	HT1736	1866	CPS1, carbamoyl-phosphate synthetase 1, mitochondrial	ATTGGCTACC [C/T]AGTGATGATC	M	C	T	P	L
G4644u3	WIAF-13803	HT1736	1993	CPS1, carbamoyl-phosphate synthetase 1, mitochondrial	TGGAGAAAGTC [A/C]GTGACAGGTT	S	A	C	S	S
G4644u4	WIAF-13804	HT1736	1860	CPS1, carbamoyl-phosphate synthetase 1, mitochondrial	GACACCATTG [G/A]CTACCCAGTG	M	G	A	G	D
G4644u5	WIAF-13831	HT1736	1087	CPS1, carbamoyl-phosphate synthetase 1, mitochondrial	AGCCTGTTTT [G/T]AATATCAAA	M	G	T	L	F
G4644u6	WIAF-13835	HT1736	1958	CPS1, carbamoyl-phosphate synthetase 1, mitochondrial	CACAAGGCC [T/C]TTGCTATGAC	M	T	C	P	L
G4644u7	WIAF-13855	HT1736	1332	CPS1, carbamoyl-phosphate synthetase 1, mitochondrial	AAAGTACCA [C/A]CAATTACATCA	M	C	A	T	N
G4659u1	WIAF-14143	HT1183	1830	catenin, alpha	GTGCCAACGT [T/C]CCTCACCGT	S	T	C	V	V

G466u1	WIAP-10164	U00968		2403	SREBF1, sterol regulatory element binding transcription factor 1	AGCAGTCCCC [G/A] CCAGGCTGCG	M	G	A	R	H
G4662u1	WIAP-13710	HT2142		2183	CTNBN1, catenin (cadherin-associated protein), beta 1 (88kD)	TTTGTGTTCCG [A/C] ATGCTGAGG	S	A	C	R	R
G467a1	WIAP-13304	X72861		827	ADRB3, adrenergic, beta-3-, receptor	GGCATTGCGC [T/C] GGACTCCGAG	M	T	C	W	R
G467a2	WIAP-13305	X72861		832	ADRB3, adrenergic, beta-3-, receptor	TGCGCTGGAC [T/A] CCGAGACTCC	S	T	A	T	T
G467a3	WIAP-13306	X72861		870	ADRB3, adrenergic, beta-3-, receptor	TTGCTGACTT [C/T] GCTGGCGCA	M	C	T	S	L
G467a4	WIAP-13307	X72861		1761	ADRB3, adrenergic, beta-3-, receptor	TGCGCGCGC [C/T] CCGCCCGGCC	M	C	T	A	V
G467a5	WIAP-13308	X72861		1899	ADRB3, adrenergic, beta-3-, receptor	TCTGTTGATC [A/C] GAACCTGTGG	-	A	C	-	-
G4671u1	WIAP-13956	HT1925		161	NDUFB7, NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 7 (18kD, B18)	TGGTGGCCAC [A/G] CAGCAGGAGA	S	A	G	T	T
G4673u1	WIAP-13889	HT0191		1349	CDC25A, cell division cycle 25A	TCTGGGGCCA [G/C] CCCCAAGAG	M	G	C	S	T
G4674u1	WIAP-13821	HT1393		261	CDC25B, cell division cycle 25B	ACGACCTCGC [C/T] GGCTCGGCA	S	C	T	A	A
G4674u2	WIAP-13822	HT1393		1297	CDC25B, cell division cycle 25B	GATGTTGCC [C/T] TATTGACGGG	S	C	T	L	L
G4674u3	WIAP-13823	HT1393		1083	CDC25B, cell division cycle 25B	ATAAGCGGAG [G/A] CGGAGCGTGA	S	G	A	R	R
G4674u4	WIAP-13827	HT1393		1446	CDC25B, cell division cycle 25B	AGAGCCCAT [C/T] GCGCCCTGTA	S	C	T	I	I
G468a1	WIAP-13309	L37019		192	ASIP, agouti (mouse)-signaling protein	AAATCCAAAC [C/A] GATCGGCGAGA	M	C	A	P	Q
G4691u1	WIAP-13753	HT97602		179	CMKBR9, chemokine (C-C motif) receptor 9	TATAGCCTGA [T/A] TTTTGTGTTG	M	T	A	I	N
G4691u2	WIAP-13754	HT97602		134	CMKBR9, chemokine (C-C motif) receptor 9	AAGGATGCAG [T/C] GGTGTCCTTT	M	T	C	V	A
G4691u3	WIAP-13755	HT97602		193	CMKBR9, chemokine (C-C motif) receptor 9	TGTGTTGGGC [C/T] TCAGCGGAA	M	C	T	L	F

G4691u4	WIAP-13756	HT97602	CMKBR9, chemokine (C-C motif) receptor 9	770	AAAATAGCTG [C/T] AGCCTTGCTG	M	C	T	A	V
G4691u5	WIAP-13759	HT97602	CMKBR9, chemokine (C-C motif) receptor 9	1130	TCTGAGAACT [A/C] CCCTAACAAAG	M	A	C	Y	S
G4691u6	WIAP-13796	HT97602	CMKBR9, chemokine (C-C motif) receptor 9	482	AGGCTGAGGA [C/A] CCGGGCCCAAG	M	C	A	T	N
G4691u7	WIAP-13797	HT97602	CMKBR9, chemokine (C-C motif) receptor 9	259	GATGTTGAG [A/G] TCTATCTGCT	M	A	G	I	V
G4691u8	WIAP-13798	HT97602	CMKBR9, chemokine (C-C motif) receptor 9	434	ATGAGCCTGG [A/G] CAAGTACCTG	M	A	G	D	G
G4691u9	WIAP-13799	HT97602	CMKBR9, chemokine (C-C motif) receptor 9	755	CAGGCCCGGG [C/T] TTTAAATA	M	C	T	A	V
G4699u1	WIAP-14040	HT4277	BAAT, bile acid Coenzyme A: amino acid N-acyltransferase (glycine N- choleoyltransferase)	1426	TTCCAGATGT [G/T] ACCAGTCAAC	S	G	T	V	V
G4726u1	WIAP-14128	HT48614	AOC3, amine oxidase, copper containing 3 (vascular adhesion protein 1)	1606	TCCACCCCGAG [T/C] GGGGCCATAG	S	T	C	S	S
G4726u2	WIAP-14129	HT48614	AOC3, amine oxidase, copper containing 3 (vascular adhesion protein 1)	2242	TTCTAACAC [A/G] GTGACTGTGG	S	A	G	T	T
G4726u3	WIAP-14141	HT48614	AOC3, amine oxidase, copper containing 3 (vascular adhesion protein 1)	659	CCTGCCCTAT [C/T] ACCGACGCC	M	C	T	H	Y
G4744u1	WIAP-13683	HT2599	CTH, cystathionase (cystathionine gamma-lyase)	564	ATATTGTCCA [T/C] AAGCATGGAG	S	T	C	H	H
G4748u1	WIAP-14144	HT1061	CYBA, cytochrome b-245, alpha polypeptide	242	GGGACAGAAG [C/T] ACATGACCGC	M	C	T	H	Y
G4748u2	WIAP-14145	HT1061	CYBA, cytochrome b-245, alpha polypeptide	265	TGGTGAAGCT [G/C] TTCGGGCCT	S	G	C	L	L
G4750u1	WIAP-14116	HT48417	CYB5, cytochrome b-5	156	TGAAGTACTA [C/T] ACCCTAGAGG	S	C	T	Y	Y
G4751u1	WIAP-13770	HT1285	UQCRC2, ubiquinol-cytochrome c reductase core protein II	495	AGAAATTTCCT [C/A] GTTGGGAAGT	M	C	A	R	S

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G4788u1	WIAF-13931	HT28249	1864	DSC3, desmocollin 3	CTGTTGATCC [T/C] GATGAACCTG	S	T	C	P	P
G4788u2	WIAF-13933	HT28249	2000	DSC3, desmocollin 3	TGATTTTCAA [G/T] ATATACCAT	N	G	T	E	*
G4788u3	WIAF-13945	HT28249	2524	DSC3, desmocollin 3	ACACTTACTC [G/A] GAGTGCACA	S	G	A	S	S
G479u1	WIAF-12567	U36310	894	GPD2, glycerol-3-phosphate dehydrogenase 2 (mitochondrial)	GGGAAAGTGC [A/G] TGTGACGGC	M	A	G	H	R
G479u2	WIAF-12574	U36310	1657	GPD2, glycerol-3-phosphate dehydrogenase 2 (mitochondrial)	CTGGCAAAG [G/T] TGGCCTATTG	M	G	T	R	S
G479u3	WIAF-12575	U36310	1131	GPD2, glycerol-3-phosphate dehydrogenase 2 (mitochondrial)	GTTATTTTCT [T/C] CTTACCCTGG	M	T	C	P	S
G480u1	WIAF-12175	HT336	250	GRB2, growth factor receptor-bound protein 2	AATGAAACCA [C/A] ATCCGTGGTT	M	C	A	H	N
G4819u1	WIAF-13985	HT97576	1804	EYAL1, eyes absent (Drosophila) homolog 1	CCCTGCACCA [T/C] GCCTTGGAAC	S	T	C	H	H
G482u1	WIAF-12181	J04501	1186	GYS1, glycogen synthase 1 (muscle)	CTGACGTCTT [T/C] CTGGAGGCAT	S	T	C	P	F
G482u2	WIAF-12195	J04501	1406	GYS1, glycogen synthase 1 (muscle)	CCTTCCCGAC [A/G] TGAAACAAGT	M	A	G	M	V
G4827u1	WIAF-14177	HT97477	68	elongation	CGAGCTGGCC [A/G] TGATGTGTAT	M	A	G	H	R
G483a1	WIAF-12113	HT4341	1850	GSY2	TTACCAGCAT [G/T] CCAGACACCT	M	G	T	A	S
G483u2	WIAF-12148	HT4341	1130	GSY2	GTTTTTCAT [A/C] TCCCTGCCCA	M	A	C	M	L
G483u3	WIAF-12149	HT4341	880	GSY2	GCTTGAATGT [T/G] AAGAAATTTT	S	T	G	V	V
G483u4	WIAF-12150	HT4341	1115	GSY2	CATCACAGTG [G/A] TGGTGTTTTT	M	G	A	V	M
G483u5	WIAF-12156	HT4341	1230	GSY2	GAAAGTTTG [G/A] AAAAAACTC	M	G	A	G	E
G483u6	WIAF-12159	HT4341	2033	GSY2	TGAGAGATAC [G/A] ATGAGGAAGA	M	G	A	D	N
G483u7	WIAF-12160	HT4341	1836	GSY2	TACTTAGGCA [G/C] ATATTACCAG	M	G	C	R	T
G483u8	WIAF-12161	HT4341	1678	GSY2	CTTACGGTAT [T/C] TACATCGTTG	S	T	C	I	I
G483u9	WIAF-12177	HT4341	790	GSY2	GGCTCACGT [G/C] TTCACACGG	S	G	C	V	V
G483u10	WIAF-12188	HT4341	1728	GSY2	TGCAATCAGC [T/C] GACTTAAGTTT	M	T	C	L	P
G484u1	WIAF-12151	HT5111	487	GSY3	CATCAAGTG [A/G] TTGGCAATGG	M	A	G	I	V
G484u2	WIAF-12187	HT5111	1141	GSY3	AACCCGGGAA [C/T] AAATCCGAGA	N	C	T	Q	*
G489u1	WIAF-12152	HT2607	1181	IRS1, insulin receptor substrate 1	AAAGAGTGGC [G/A] GCACAAGTCG	M	G	A	R	Q
G489u2	WIAF-12184	HT2607	1031	IRS1, insulin receptor substrate 1	ATGGCGAGCC [C/T] TCCGGAGAGC	M	C	T	P	L
G492a1	WIAF-13345	L08603	307	MC4R, melanocortin 4 receptor	AGAAACCAT [A/G] TCATCACCCCT	M	A	G	I	V

G493u1	WIAP-12154	X67594			MC1R, melanocortin 1 receptor (alpha melanocyte stimulating hormone receptor)	346		CGCGCTGGTG [G/T] TGCCACCAT	M	G	T	V	L
G493u2	WIAP-12167	X67594			MC1R, melanocortin 1 receptor (alpha melanocyte stimulating hormone receptor)	646		GACCCTGCCG [C/T] GGGCGGGCA	M	C	T	R	W
G493u3	WIAP-12170	X67594			MC1R, melanocortin 1 receptor (alpha melanocyte stimulating hormone receptor)	1110		AGGTGCTGAC [A/G] TGCTCTGGT	S	A	G	T	T
G493u4	WIAP-12186	X67594			MC1R, melanocortin 1 receptor (alpha melanocyte stimulating hormone receptor)	442		CGGGAGCAAC [G/T] TGCTGGAGAC	M	G	T	V	L
G498u1	WIAP-11809	J04127			CYP19, cytochrome P450, subfamily XIX (aromatization of androgens)	1305		CTTATAGGTA [C/T] TTTCAGCCAT	S	C	T	Y	Y
G498u2	WIAP-11810	J04127			CYP19, cytochrome P450, subfamily XIX (aromatization of androgens)	1377		TGAAAGCCAT [C/T] CTGGTTACAC	S	C	T	I	I
G498u3	WIAP-11811	J04127			CYP19, cytochrome P450, subfamily XIX (aromatization of androgens)	1406		CGATTCCAGC [T/C] GAAGACATTG	M	T	C	V	A
G498u4	WIAP-11838	J04127			CYP19, cytochrome P450, subfamily XIX (aromatization of androgens)	1055		ATTGGTGAGA [G/A] AGACATAAAG	M	G	A	R	K
G498u5	WIAP-11800	J04127			CYP19, cytochrome P450, subfamily XIX (aromatization of androgens)	1001		ATTGCAAAAG [A/G] CCTAATGTT	M	A	G	H	R
G499u1	WIAP-11785	HT1439			ESR1, estrogen receptor 1	2142		TCCCTGCCAC [A/G] GTCTGAGAC	S	A	G	T	T
G499u2	WIAP-11801	HT1439			ESR1, estrogen receptor 1	443		CCCCTGAACC [G/A] TCCGAGCTC	M	G	A	R	H
G500u1	WIAP-11803	X99101			ESR1, estrogen receptor 1	793		CATGATCAGC [T/C] GGGCCAAGAA	M	T	C	W	R

G500u2	WIAP-11816	X99101	489	ESR1, estrogen receptor 1	GGAAGTGTGTA[C/T]GAAGTGGGA	S	C	T	Y	Y
G500u3	WIAP-11817	X99101	474	ESR1, estrogen receptor 1	AGCCTGCGG[A/G]CTTCGAACT	S	A	G	R	R
G505u1	WIAP-11824	HT1113	1063	PRLR, prolactin receptor	GCTTGAAGG[G/A]CTATAGCATG	M	G	A	G	D
G505u2	WIAP-11827	HT1113	2083	PRLR, prolactin receptor	GCAACATCAA[G/A]CAAGTGCAGG	M	G	A	S	N
G505u3	WIAP-11787	HT1113	582	PRLR, prolactin receptor	GAGGACATAC[G/A]TCATGATGAT	M	A	G	I	V
G505u4	WIAP-11802	HT1113	792	PRLR, prolactin receptor	CTGTATGAA[A/C]TTCGATTTAA	M	A	C	I	L
G509u1	WIAP-11789	M32313	378	SRD5A1, steroid-5-alpha-reductase, alpha polypeptide 1 (3-oxo-5 alpha-steroid delta 4-dehydrogenase alpha 1)	CACTGTGGC[A/G]TGTAACAATGG	S	A	G	A	A
G510a1	WIAP-13348	U17280	582	STAR, steroidogenic acute regulatory protein	CCAATGTCAA[G/A]GAGATCAAGG	S	G	A	K	K
G52u1	WIAP-10224	HT0488	1139	inhibin, beta B	CCAACATGAT[T/C]GTGGAGGAGT	S	T	C	I	I
G520u1	WIAP-13507	D31770	517	ACVR2, activin A receptor, type II	CTTATTTTCC[G/A]GAGATGGAAG	S	G	A	P	P
G520u2	WIAP-13532	D31770	1177	ACVR2, activin A receptor, type II	CAGCTTGCAT[T/G]GCTGACTTTG	M	T	G	I	M
G520u3	WIAP-13533	D31770	1189	ACVR2, activin A receptor, type II	CTGACTTTGG[G/C]TTGGCCTTAA	S	G	C	G	G
G520u4	WIAP-13534	D31770	1024	ACVR2, activin A receptor, type II	TCTCTTGGAA[T/C]GAACTGTGTC	S	T	C	N	N
G523u1	WIAP-12155	HT4996	538	OXTR, oxytocin receptor	TGAGCGGAA[C/T]GCGTGTGTC	S	C	T	N	N
G523u2	WIAP-12180	HT4996	1057	OXTR, oxytocin receptor	TCTGCGAGAA[C/T]TTGCGGCTCA	S	C	T	N	N
G524a1	WIAP-13349	L05144	190	PK1, phosphoenolpyruvate carboxykinase 1 (soluble)	TGGACNGCCT[G/A]CCCCAGGCAG	S	G	A	L	L
G528u1	WIAP-11831	V00572	988	PK1, phosphoglycerate kinase 1	AAGCCACTGT[G/C]GCTTCTGGCA	S	G	C	V	V
G53u1	WIAP-10307	HT0508	723	DNA repair protein XRCC1	CCAGCGACCG[G/A]GCAGGACCTA	S	G	A	P	P
G53u2	WIAP-10308	HT0508	746	DNA repair protein XRCC1	TATGAGCTG[C/T]TACCCCTCCAG	M	C	T	A	V
G53u3	WIAP-10309	HT0508	1884	DNA repair protein XRCC1	GGGATCCCA[C/T]TTTGAGGAGG	S	C	T	S	S
G53u4	WIAP-10362	HT0508	425	DNA repair protein XRCC1	AACCCCAACC[G/A]CGTTGCGATG	M	G	A	R	H
G534a1	WIAP-13310	U28281	1284	SCTR, secretin receptor	GCTTCTCAA[T/C]GGGAGGTGC	S	T	C	N	N
G534a2	WIAP-13311	U28281	1404	SCTR, secretin receptor	AGCAGAGCCA[G/A]GGCAGCTGCA	S	G	A	Q	Q
G535u1	WIAP-12157	HT5001	1158	SCTR, secretin receptor	ATGCTCTTGG[G/C]GTGCTCCAC	S	G	C	R	R
G535u2	WIAP-12196	HT5001	774	SCTR	ATGAGGAGGA[G/A]GAAGAGCCAC	S	G	A	E	E



G536u1	WIAF-13923	M20747		SLC2A4, solute carrier family 2 (facilitated glucose transporter), member 4	535		GCCTGGCCAA [C/T] GCTGCTGCT	S	C	T	N	N
G538u1	WIAF-11812	M55531		SLC2A5, solute carrier family 2 (facilitated glucose transporter), member 5	438		GCAGCAGAGT [C/T] GCCACATCAT	S	C	T	V	V
G538u2	WIAF-11813	M55531		SLC2A5, solute carrier family 2 (facilitated glucose transporter), member 5	124		GACGCTTGTC [C/T] TTGCCCTGGC	M	C	T	L	F
G538u3	WIAF-11791	M55531		SLC2A5, solute carrier family 2 (facilitated glucose transporter), member 5	816		ACAGGAGAGT [G/A] GCCGAGATCC	S	G	A	V	V
G539u1	WIAF-12158	K03195		Human (HepG2) glucose transporter gene mRNA, complete cds.	224		TCATGCTGGC [T/C] GTGGGAGGAG	S	T	C	A	A
G539u2	WIAF-12191	K03195		Human (HepG2) glucose transporter gene mRNA, complete cds.	1244		CCATCGCGCT [A/G] GCACCTGCTGG	S	A	G	L	L
G540a1	WIAF-12114	HT960		1100 SOS1			AGTGAAGATC [A/C] AGAAGACAAG	M	A	C	Q	P
G540u2	WIAF-12165	HT960		933 SOS1			ATGATCGTTT [C/T] CTTAGTCAGT	S	C	T	F	F
G540u3	WIAF-12178	HT960		399 SOS1			TACTAGCAGT [C/T] TTAGATACA	S	C	T	V	V
G540u4	WIAF-12193	HT960		195 SOS1			CTCAGCCCG [A/C] AGTGTTCAG	S	A	C	R	R
G540u5	WIAF-12197	HT960		1329 SOS1			GTGTAATGA [A/G] TTTATATATGG	S	A	G	E	R
G540u6	WIAF-12198	HT960		1339 SOS1			ATTATATATG [G/A] AGGAACTCT	M	G	A	E	K
G543a1	WIAF-13312	J00306		1373 SST, somatostatin			AAGCAGGAAC [T/C] GGCCAAGTAC	M	T	C	L	P
G543a2	WIAF-13313	J00306		1603 SST, somatostatin			AGTATTGTCC [A/G] TATCAGACCT	-	A	G	-	-
G544u1	WIAF-12174	HT27489		SUR, sulfonylurea receptor (hyperinsulinemia)	982		CCATTGACAT [G/C] GCCACGGAAA	M	G	C	M	I
G546u1	WIAF-13618	HT225		TKT, transketolase (Wernicke- Korsakoff syndrome)	426		GCTACATTGC [C/T] GAGCAGAAC	S	C	T	A	A
G551u1	WIAF-11709	HT1118		TNFRSF1B, tumor necrosis factor receptor superfamily, member 1B	257		GCTGCAGCAA [A/G] TGTCTGCCCGG	S	A	G	K	K

G551u2	WIAF-11710	HT1118		TNFRSF1B, tumor necrosis factor 449 receptor superfamily, member 1B	TCTGCACCTG[C/T]AGGCCGGCT	S	C	T	C	C
G551u3	WIAF-11719	HT1118		TNFRSF1B, tumor necrosis factor 648 receptor superfamily, member 1B	GATCTGTAAC[G/A]TGGTGGCCAT	M	G	A	V	M
G551u4	WIAF-11673	HT1118		TNFRSF1B, tumor necrosis factor 676 receptor superfamily, member 1B	AATGCAAGCA[T/G]GGATGCAGTC	M	T	G	M	R
G551u5	WIAF-11720	HT1118		TNFRSF1B, tumor necrosis factor 808 receptor superfamily, member 1B	CCAAGCACCT[C/T]CTTCCTGCTC	M	C	T	S	F
G552u1	WIAF-12229	HT5108		384 TRAP3	GCGCTGCCG[G/A]CTCATGCTGA	S	G	A	P	P
G555u1	WIAF-12211	U94592		UCP2, uncoupling protein 2 (mitochondrial, proton carrier)	CGCGCTACAG[T/C]CAGCGCCAG	M	T	C	V	A
G556u1	WIAF-11804	AF001787		UCP2, uncoupling protein 2 (mitochondrial, proton carrier)	TCGGCTCTA[T/C]GACTGGTCA	S	T	C	Y	Y
G556u2	WIAF-11805	AF001787		UCP2, uncoupling protein 2 (mitochondrial, proton carrier)	TGCACCACAG[G/A]AGCCATGGCG	M	G	A	G	E
G556u3	WIAF-11823	AF001787		UCP2, uncoupling protein 2 (mitochondrial, proton carrier)	TACGGGAATC[A/G]CGGTTTGAA	S	A	G	S	S
G556u4	WIAF-11782	AF001787		UCP2, uncoupling protein 2 (mitochondrial, proton carrier)	ATCCTGACCA[T/C]GGTGGGACT	M	T	C	M	T
G561a1	WIAF-12111	HT1176		2430 IDE, insulin-degrading enzyme	ACTGTGGCAT[C/A]GAATATACT	S	C	A	I	I
G561u2	WIAF-12222	HT1176		3099 IDE, insulin-degrading enzyme	ATATTAACTT[C/G]ATGGCTGCAA	M	C	G	F	L
G562u1	WIAF-12223	HT27503		tumor necrosis factor receptor type 1 associated protein	CCTGTAGTGA[A/C]TCGGCCGCTG	M	A	C	N	T
G562u2	WIAF-12224	HT27503		tumor necrosis factor receptor type 1 associated protein	CGCTGCAGCG[C/A]CTGGTGGAGG	S	C	A	R	R

G573u1	WIAF-12199	HT28094	469	SSTR1, somatostatin receptor 1	GGACCGCTAC [G/C] TGGCCGTGGT	M	G	C	V	L
G573u2	WIAF-12208	HT28094	480	SSTR1, somatostatin receptor 1	TGGCCGTGGT [G/A] CATCCCATCA	S	G	A	V	V
G573u3	WIAF-12209	HT28094	879	SSTR1, somatostatin receptor 1	TGCAGCTGGT [T/C] ACGTGTGTTG	S	T	C	V	V
G574u1	WIAF-11822	HT4058	1054	SSTR5, somatostatin receptor 5	GCACGGAGC [C/T] GCGTCCAGAC	M	C	T	P	L
G575u1	WIAF-12200	HT28095	99	SSTR3, somatostatin receptor 3	ACGTGTGGC [G/A] GGCCCAAGCC	S	G	A	A	A
G575u2	WIAF-12217	HT28095	453	SSTR3, somatostatin receptor 3	CCACCGCTC [G/A] GCCCGCTGGC	S	G	A	S	S
G585u1	WIAF-12204	HT1022	1133	PYGL, phosphorylase, glycogen; liver (Hers disease, glycogen storage disease type VI)	AGCTGAATGA [T/C] ACTCACCTC	S	T	C	D	D
G585u2	WIAF-12205	HT1022	1988	PYGL, phosphorylase, glycogen; liver (Hers disease, glycogen storage disease type VI)	AGCTGATCAC [T/C] TCAGTGGCAG	S	T	C	T	T
G585u3	WIAF-12225	HT1022	1883	PYGL, phosphorylase, glycogen; liver (Hers disease, glycogen storage disease type VI)	TGTACACCG [C/T] ATTAAGAAAG	S	C	T	R	R
G585u4	WIAF-12226	HT1022	2037	PYGL, phosphorylase, glycogen; liver (Hers disease, glycogen storage disease type VI)	AAGCAAGTTG [A/G] AAGTCACTCT	M	A	G	K	E
G585u5	WIAF-12231	HT1022	1387	PYGL, phosphorylase, glycogen; liver (Hers disease, glycogen storage disease type VI)	GATGTGGACC [C/G] TCTGAGAAGG	M	C	G	P	R
G586a1	WIAF-12112	HT1878	2410	PFKM, phosphofructokinase, muscle	CCGGGAAGC [T/G] GCCGTCTAAA	S	T	G	A	A
G586u2	WIAF-12206	HT1878	375	PFKM, phosphofructokinase, muscle	GGACGACTCC [G/A] AGCTGCCTAC	M	G	A	R	Q

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G586u3	WIAF-12207	HT1878	322 PFKM, phosphofructokinase, muscle	TGGGAGGCAC [G/A] GTGATTGGAA	S	G	A	T	T
G586u4	WIAF-12227	HT1878	334 PFKM, phosphofructokinase, muscle	TGATTGGAAG [T/C] GCCCGGTGCA	S	T	C	S	S
G586u5	WIAF-12228	HT1878	408 PFKM, phosphofructokinase, muscle	CGTGGATCA [C/G] CAATCTCTGT	M	C	G	T	S
G586u6	WIAF-12235	HT1878	717 PFKM, phosphofructokinase, muscle	CACCTGTGGAT [A/G] CCTGGCCCTT	M	A	G	Y	C
G587u1	WIAF-12615	HT3847	366 phosphofructokinase, liver	ATGCAGGCT [T/C] ACAGGTGCCA	S	T	C	L	L
G589u1	WIAF-12210	L39211	CPT1A, carnitine 1327 palmitoyltransferase I, liver	CAGCCTTCTT [C/T] GTGACGTTAG	S	C	T	P	P
G589u2	WIAF-12215	L39211	CPT1A, carnitine 2080 palmitoyltransferase I, liver	AATATCTGCG [T/C] GTGAGTCCC	S	T	C	A	A
G589u3	WIAF-12216	L39211	CPT1A, carnitine 679 palmitoyltransferase I, liver	ACTTCAAAACG [G/T] ATGACAGCAC	S	G	T	R	R
G589u4	WIAF-12218	L39211	CPT1A, carnitine 1844 palmitoyltransferase I, liver	CCTCACATAC [G/C] AGGCCTCCAT	M	G	C	E	Q
G592u1	WIAF-11814	X96586	NSMAF, neutral sphingomyelinase (N-SMase) activation associated 1089 factor	TCCGGGATCT [C/T] AGTAGCCAG	S	C	T	L	L
G592u2	WIAF-11815	X96586	NSMAF, neutral sphingomyelinase (N-SMase) activation associated 2020 factor	AAGTATATCA [T/G] TTCAATAT	M	T	G	F	V
G592u3	WIAF-11834	X96586	NSMAF, neutral sphingomyelinase (N-SMase) activation associated 1673 factor	GTAGCCATGC [T/C] TACGCAATC	M	T	C	L	P

G592u4	WIAF-11784	X96586	1889	NSMAF, neutral sphingomyelinase (N-SMase) activation associated factor	CACGAGCACT [A/G] TAAATCCAC	M	A	G	Y	C
G592u5	WIAF-11798	X96586	1677	NSMAF, neutral sphingomyelinase (N-SMase) activation associated factor	CCATGCTTAC [G/A] CAAATCTTGG	S	G	A	T	T
G592u6	WIAF-11799	X96586	2429	NSMAF, neutral sphingomyelinase (N-SMase) activation associated factor	TGCCATTGAG [G/C] GATTGTATGT	M	G	C	G	A
G592a7	WIAF-13156	X96586	2205	NSMAF, neutral sphingomyelinase (N-SMase) activation associated factor	ATTCTGCATC [G/A] TGGGACTCTA	S	G	A	S	S
G594u1	WIAF-10065	HT3921	1153	annexin V, alt. transcript 2	TTGTGAAATC [T/A] ATTCCAAGTA	S	T	A	S	S
G594u2	WIAF-10098	HT3921	567	annexin V, alt. transcript 2	CGAAGTAATG [C/T] TCAGGCCGAG	M	C	T	A	V
G594u3	WIAF-10099	HT3921	774	annexin V, alt. transcript 2	ATTGCTTCAA [G/C] GACACCTGAA	M	G	C	R	T
G594a4	WIAF-10505	HT3921	424	annexin V, alt. transcript 2	GAGTAGTCGC [C/T] ATGGCACAGG	-	C	T	-	-
G594a5	WIAF-13123	HT3921	571	annexin V, alt. transcript 2	GTAATGCTCA [G/C] CGCCAGGAAA	M	G	C	Q	H
G595u1	WIAF-12203	HT27983	1008	NR1P1, nuclear receptor interacting protein 1	TGCAAGATTA [C/T] AGGCTGTTGC	N	C	T	Q	*
G595u2	WIAF-12220	HT27983	785	NR1P1, nuclear receptor interacting protein 1	CCCTCAGTCA [T/C] GATTCTTTAA	S	T	C	H	H
G595u3	WIAF-12232	HT27983	1231	NR1P1, nuclear receptor interacting protein 1	GTTGGCAGTT [A/T] CCAGCTCCCA	M	A	T	Y	F
G595u4	WIAF-12261	HT27983	2048	NR1P1, nuclear receptor interacting protein 1	GCAGTACTCA [G/A] TCTGAAAAGC	S	G	A	Q	Q
G595u5	WIAF-12274	HT27983	2376	NR1P1, nuclear receptor interacting protein 1	TCCTGAACCA [G/T] GGCTTTCTGG	M	G	T	G	W
G595u6	WIAF-12275	HT27983	3498	NR1P1, nuclear receptor interacting protein 1	ACTATATTAC [A/G] TGCTTCAMAA	M	A	G	M	V

G595u7	WIAF-12276	HT27983	3671	NR1P1, nuclear receptor interacting protein 1	ACAAATAGCCA [T/C] ATGGGAATA	S	T	C	H	H
G595u8	WIAF-12294	HT27983	2020	NR1P1, nuclear receptor interacting protein 1	ATCAAATGGA [A/G] TTCCCCACCA	M	A	G	N	S
G595u9	WIAF-12295	HT27983	3140	NR1P1, nuclear receptor interacting protein 1	ATTGTCTCCC [G/A] CACAGAAGTA	S	G	A	P	P
G596u1	WIAF-10144	HT3537	3299	PC, pyruvate carboxylase	TGCGTCCAT [C/T] TTGGTCAAGG	S	C	T	I	I
G596u2	WIAF-10158	HT3537	2662	PC, pyruvate carboxylase	ACCAACTGCA [A/C] CTTCAGGCC	M	A	C	H	P
G596u3	WIAF-10159	HT3537	2156	PC, pyruvate carboxylase	CCATCTCATA [C/A] ACGGGGACG	N	C	A	Y	*
G598a1	WIAF-12118	HT48666	5585	HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	GGACCTATG [C/T] TGATAACTG	M	C	T	A	V
G598u2	WIAF-12236	HT48666	4456	HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	CCTGTTAATA [T/C] TAGAGTAAG	S	T	C	L	L
G598u3	WIAF-12237	HT48666	6356	HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	GGTAATGAAG [G/T] CACGTGTGTT	M	G	T	G	V
G598u4	WIAF-12240	HT48666	12219	HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	GTACCTTTGT [C/T] ATCCAGGCCA	S	C	T	V	V
G598u5	WIAF-12241	HT48666	12480	HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	CCAGGCAGAT [C/G] GAGGCCTTAC	M	C	G	I	M
G598u6	WIAF-12244	HT48666	12975	HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	GAGTAATCAT [T/A] GAAGATGTGG	S	T	A	I	I

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G598u7	WIAP-12245	HT48666	1424	HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	TCCAATAATC [A/T] GTCAACTTTA	M	A	T	Q	L
G598u8	WIAP-12250	HT48666	5854	HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	TTCAAAAGCA [A/T] TTCAATCAAA	M	A	T	I	P
G598u9	WIAP-12251	HT48666	6754	HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	TATTCAGCTC [G/A] TCCGTATCCT	M	G	A	V	I
G598u10	WIAP-12252	HT48666	7635	HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	ATCTTTACCT [C/T] GGTGCTATGA	S	C	T	L	L
G598u11	WIAP-12254	HT48666	9189	HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	GTGGAATCC [A/G] TACTACCTGT	S	A	G	P	P
G598u12	WIAP-12255	HT48666	10119	HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	TTGTGGCATT [G/C] CTAGCAGACA	M	G	C	L	F
G598u13	WIAP-12257	HT48666	11109	HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	ATCCATCTAT [T/C] GTAAATGGCA	S	T	C	I	I





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G598u21	WIAF-12279	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1 893	TATCTTCTTG [A/T]ATGGATAGAA	M	A	T	E	V
G598u22	WIAF-12280	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1 13276	AGAAATCAGC [A/G]TTCACACGGT	M	A	G	I	V
G598u23	WIAF-12283	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1 6519	CCTGTGTGTT [A/T]GACATGGAG	M	A	T	L	F
G598u24	WIAF-12284	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1 8386	GGGTTCTCT [C/T]TTCGGCAGAT	M	C	T	L	F
G598u25	WIAF-12286	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1 10266	CAGCTCAGCA [A/T]CTCGTGCGCA	M	A	T	Q	H
G598u26	WIAF-12287	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1 10099	CTTTGTTGTA [A/G]CACAGGCCCT	M	A	G	T	A
G598u27	WIAF-12289	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1 11835	AGAACTGTCT [G/C]CCTGACCCCTG	S	G	C	L	L

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G598u28	WIAF-12290	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	12689	TTAAACCACA [C/T]TTTGCGAGTG	M	C	T	T	I
G598u29	WIAF-12291	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	14655	ACGTGGACAA [C/T]GCCGAGGGCT	S	C	T	N	N
G598u30	WIAF-12296	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	393	ATTCCCCATT [T/C]GCCGGGGCAC	S	T	C	F	F
G598u31	WIAF-12297	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	479	GGCAAGGTGA [A/G]GCAGCAGCAG	M	A	G	K	R
G598u32	WIAF-12298	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	1197	ATGCTCCCAT [T/C]GTCTCCGAAA	S	T	C	I	I
G598u33	WIAF-12300	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	3595	TCCAGAGGAA [C/T]AGGACACTGC	N	C	T	Q	*
G598u34	WIAF-12301	HT48666		HERC1, hect (homologous to the E6 AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	3661	CACCTCTCAA [T/C]TGGATAAATG	S	T	C	L	L
G601u1	WIAF-12246	HT27734		PRKMS, protein kinase, mitogen-activated, kinase 5 (MAP kinase 5)	106	TGGAGAACCA [G/A]GTGCTGGTAA	S	G	A	Q	Q

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G601u2	WIAF-12247	HT27734		PRKM5, protein kinase, mitogen-activated, kinase 5 (MAP kinase 5)	351	GTAATGGAC(A/G)GTTAATAGAG	M	A	G	Q	R
G601u3	WIAF-12292	HT27734		PRKM5, protein kinase, mitogen-activated, kinase 5 (MAP kinase 5)	617	AGCATATCAT(G/C)TCGGAGTGG	M	G	C	V	L
G603u1	WIAF-12248	HT4291		mitogen-activated protein (MAP) kinase p38	1336	AGTCATCAGC(T/C)TTGTGCCACC	M	T	C	F	L
G603u2	WIAF-12281	HT4291		mitogen-activated protein (MAP) kinase p38	1230	CTCAGTACCA(C/T)GATCCTGATG	S	C	T	H	H
G610u1	WIAF-12249	HT48690		protein kinase, mitogen-activated, p38Beta (MAP kinase p38Beta)	1012	CCGAGCCATA(T/C)GATGAGAGCG	S	T	C	Y	Y
G610u2	WIAF-12263	HT48690		protein kinase, mitogen-activated, p38Beta (MAP kinase p38Beta)	799	AAATCTCCTC(G/A)GAACACGCC	S	G	A	S	S
G610u3	WIAF-12264	HT48690		protein kinase, mitogen-activated, p38Beta (MAP kinase p38Beta)	848	GCCCCAGAAG(G/A)ACCTGAGCAG	M	G	A	D	N
G610u4	WIAF-12282	HT48690		protein kinase, mitogen-activated, p38Beta (MAP kinase p38Beta)	439	TCCTGGTTTA(C/T)CAGCTGCTGC	S	C	T	Y	Y
G612u1	WIAF-12344	HT1436		RAF1, v-raf-1 murine leukemia viral oncogene homolog 1	1513	TTTGATGCA(A/G)AGAACATCAT	M	A	G	K	E
G614u1	WIAF-12267	HT321		BRAF, v-raf murine sarcoma viral oncogene homolog B1	603	GACAGTCTAA(A/G)GAAAGCACTG	M	A	G	K	R
G614u2	WIAF-12268	HT321		BRAF, v-raf murine sarcoma viral oncogene homolog B1	2282	CCAAACAGAG(G/A)ATTTTAGTCT	M	G	A	D	N
G614u3	WIAF-12299	HT321		BRAF, v-raf murine sarcoma viral oncogene homolog B1	973	AGGAAGAGGC(G/A)TCCTTAGCAG	S	G	A	A	A
G616u1	WIAF-12253	HT48746		498 TRAF-interacting protein (I-TRAF)	498	AAGAAGACAA(G/T)AGGTTTCTTC	N	G	T	E	*
G616u2	WIAF-12269	HT48746		1338 TRAF-interacting protein (I-TRAF)	1338	GCATATACCT(C/G)GAGTATGTGA	M	C	G	R	G

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G616u3	WIAP-12285	HT48746	377	TRAF-interacting protein (I-TRAF)	ATAACAATTAT(T/C)GGCTGTGTCC	S	T	C	Y	Y
G616u4	WIAP-12288	HT48746	1032	TRAF-interacting protein (I-TRAF)	TGAATTCAG(G/A)GAATTGACCC	M	G	A	G	R
G617u1	WIAP-12256	HT1614	52	PPP1CA, protein phosphatase 1, catalytic subunit, alpha isoform	GAAGCTCAAC(C/T)TGACTCGAT	S	C	T	L	L
G617u2	WIAP-12270	HT1614	792	PPP1CA, protein phosphatase 1, catalytic subunit, alpha isoform	AAGACGGCTA(C/T)GAGTTCTTTG	S	C	T	Y	Y
G618u1	WIAP-12238	HT27508	1598	protein phosphatase, 2A B56-alpha subunit	CATTGAACCA(A/C)CACAGTTCAA	M	A	C	T	P
G618u2	WIAP-12271	HT27508	1135	protein phosphatase, 2A B56-alpha subunit	ATCAGAAATT(C/T)GTACAACAGC	S	C	T	F	F
G62u1	WIAP-10369	HT0855	214	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	AGGAGTACCT(G/C)TCCTTCGTT	S	G	C	L	L
G62u2	WIAP-10370	HT0855	926	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	AAACTGTCT(T/C)TTGAAAGGAA	M	T	C	F	L
G62u3	WIAP-10428	HT0855	2904	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	AGCACGGACA(C/T)GCAGGCCCGG	M	C	T	T	M
G62u4	WIAP-10430	HT0855	3368	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	TGACCCCTCAC(A/G)TGAGTAGTAA	M	A	G	M	V
G62u5	WIAP-10451	HT0855	1376	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	TTCTGGGGAA(G/A)AAGCTGAAGC	M	G	A	E	K
G62u6	WIAP-10452	HT0855	3716	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	TAAGCATTGC(A/G)GAGACGCCAA	M	A	G	R	G

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G62u7	WIAF-10453	HT0855		3967	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	CCTGAAAGC [A/C] CTGAGGCTCT	S	A	C	A	A
G62u8	WIAF-10454	HT0855		4016	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	TGGTGTTCCTCC [A/G] CCTGGACTGG	M	A	G	T	A
G62u9	WIAF-10455	HT0855		3979	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	TGAGGCTCTC [T/C] CGTCAGCGGT	S	T	C	S	S
G62u10	WIAF-10456	HT0855		3729	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	GACGCCAAGT [T/G] TGAAGGAAGT	M	T	G	F	C
G62u11	WIAF-10476	HT0855		1275	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	TCTGGAGATG [G/A] TACTGACTAT	M	G	A	G	D
G62u12	WIAF-10477	HT0855		2017	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	TGATCTTGA [C/T] GAAGGACACA	S	C	T	D	D
G62u13	WIAF-10479	HT0855		3265	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	CTAACATATC [T/C] GTAATGATG	S	T	C	S	S
G62u14	WIAF-10481	HT0855		4317	ERCC6, excision repair cross-complementing rodent repair deficiency, complementation group 6	GGGCACCTGC [A/G] GGAAGCTTCT	M	A	G	Q	R
G620a1	WIAF-12116	HT1943		1256	pp2CB, protein phosphatase 2 (formerly 2A), catalytic subunit, beta isoform	TATCATGGAA [T/A] TAGATGACAC	M	T	A	L	I

G620a2	WIAF-12117	HT1943	1326	PPP2CB, protein phosphatase 2 (formerly 2A), catalytic subunit, beta isoform	CCTCATGTTA [C/G]ACGGCCACC	M	C	G	T	R
G620u3	WIAF-12239	HT1943	819	PPP2CB, protein phosphatase 2 (formerly 2A), catalytic subunit, beta isoform	TTTTATGATG [A/G]ATGTCTCGCA	M	A	G	E	G
G623u1	WIAF-12260	HT3979	459	PPP1CB, protein phosphatase 1, catalytic subunit, beta isoform	TTCATGGACA [A/G]TATACAGATT	S	A	G	Q	Q
G625u1	WIAF-12266	HT1961	227 B (PR 52),	PPP2R2A, protein phosphatase 2 (formerly 2A), regulatory subunit alpha isoform	CATTCTGGAG [A/G]ATTACTAGCA	M	A	G	E	G
G628a1	WIAF-12104	HT2780	1104	PPP1CC, protein phosphatase 1, catalytic subunit, gamma isoform	AGGGGTATGA [T/A]CACAAAGCAA	M	T	A	I	N
G628a2	WIAF-12105	HT2780	973	PPP1CC, protein phosphatase 1, catalytic subunit, gamma isoform	CCAATTATTG [C/T]GGAGAGTTTG	S	C	T	C	C
G628u3	WIAF-12311	HT2780	888	PPP1CC, protein phosphatase 1, catalytic subunit, gamma isoform	GATCTTATAT [G/T]TAGAGCCCAT	M	G	T	C	F
G630a1	WIAF-12103	HT5086	704	protein phosphatase 2A, 130 kDa regulatory subunit	AAAGATGCAG [A/G]TCTGAACCTCT	M	A	G	D	G
G630a2	WIAF-12106	HT5086	1015	protein phosphatase 2A, 130 kDa regulatory subunit	CGATGGGAAC [G/T]CCCCATCCTT	M	G	T	A	S
G630a3	WIAF-12107	HT5086	1024	protein phosphatase 2A, 130 kDa regulatory subunit	CGCCCCATCC [T/C]TTGGTTTACT	M	T	C	F	L
G630a4	WIAF-12108	HT5086	837	protein phosphatase 2A, 130 kDa regulatory subunit	ACTTAAAGGA [T/C]ATTGCAGGAG	S	T	C	D	D
G630u5	WIAF-12325	HT5086	1300	protein phosphatase 2A, 130 kDa regulatory subunit	TAAAGATGTG [C/T]TTGGACATCT	S	C	T	C	C
G630u6	WIAF-12326	HT5086	2810	protein phosphatase 2A, 130 kDa regulatory subunit	ATGTTCCAGG [C/T]TGCAGGGGA	M	C	T	A	V
G630u7	WIAF-12351	HT5086	512	protein phosphatase 2A, 130 kDa regulatory subunit	ATTATGGCAG [C/T]AACTTACAGA	M	C	T	A	V

G630u8	WIAF-12352	HT5086	703	protein phosphatase 2A, 130 kDa regulatory subunit	CAAAGATGCA [G/A] ATCTGAACCTC	M	G	A	D	N
G630u9	WIAF-12353	HT5086	1069	protein phosphatase 2A, 130 kDa regulatory subunit	ACCTTGTCT [C/T] ATAGAAACTC	M	C	T	H	Y
G634u1	WIAF-11825	X04434	2283	IGF1R, insulin-like growth factor 1 receptor	TGCAAGTGGC [C/T] AACACCACCA	S	C	T	A	A
G634u2	WIAF-11826	X04434	2279	IGF1R, insulin-like growth factor 1 receptor	GTCATGCAAG [T/C] GGCCAACACC	M	T	C	V	A
G634u3	WIAF-11781	X04434	1731	IGF1R, insulin-like growth factor 1 receptor	ACAAGGACGT [G/A] GAGCCCGGCA	S	G	A	V	V
G634a4	WIAF-13106	X04434	948	IGF1R, insulin-like growth factor 1 receptor	TCCACGACGG [C/A] GAGTGCATGC	S	C	A	G	G
G634a5	WIAF-13107	X04434	1089	IGF1R, insulin-like growth factor 1 receptor	CTTCTGTCTCA [G/C] ATGCTCCAAG	M	G	C	Q	H
G634a6	WIAF-13108	X04434	2539	IGF1R, insulin-like growth factor 1 receptor	AGAAGGAGCA [G/A] ATGCAATCC	M	G	A	D	N
G634a7	WIAF-13109	X04434	2606	IGF1R, insulin-like growth factor 1 receptor	AAGTGGCCGG [A/C] ACCTGAGAAT	M	A	C	E	A
G634a8	WIAF-13111	X04434	1543	IGF1R, insulin-like growth factor 1 receptor	CTCCACCACC [A/T] CGTCGAAGAA	M	A	T	T	S
G634a9	WIAF-13112	X04434	1549	IGF1R, insulin-like growth factor 1 receptor	CACCACGTGG [A/G] AGAATCGCAT	M	A	G	K	E
G634a10	WIAF-13113	X04434	1596	IGF1R, insulin-like growth factor 1 receptor	CCCCTGACTA [C/T] AGGATCTCA	S	C	T	Y	Y
G645u1	WIAF-12332	HT5191	1127	retinoic acid-binding protein II	TCTGCAGACT [C/T] TTCAGGAGAG	M	C	T	L	F
G645u2	WIAF-12333	HT5191	1048	retinoic acid-binding protein II	AAGCATTAGA [G/A] GCCTTACAGA	S	G	A	E	E
G646u1	WIAF-12303	X81479	1204	EMR1, egf-like module containing, mucin-like, hormone receptor-like sequence 1	CAATATCCA [T/C] GTGGACTAAA	M	T	C	M	T
G646u2	WIAF-12304	X81479	1919	EMR1, egf-like module containing, mucin-like, hormone receptor-like sequence 1	TTCTGCTGTG [T/G] CGCTCCATCC	M	T	G	C	W

G646u3	WIAP-12316	X81479	590	EMR1, egf-like module containing, mucin-like, hormone receptor-like sequence 1	CTGCCGAGA [G/T] CATGCACTT	M	G	T	E	D
G646u4	WIAP-12317	X81479	799	EMR1, egf-like module containing, mucin-like, hormone receptor-like sequence 1	GCACCAAGCA [G/A] TGCACAGTTG	M	G	A	S	N
G646u5	WIAP-12318	X81479	558	EMR1, egf-like module containing, mucin-like, hormone receptor-like sequence 1	TGAAGACGTG [A/G] ATGAATGTGC	M	A	G	N	D
G646u6	WIAP-12314	X81479	207	EMR1, egf-like module containing, mucin-like, hormone receptor-like sequence 1	TTACTATTGC [A/G] CTGCAACA	M	A	G	T	A
G646u7	WIAP-12335	X81479	458	EMR1, egf-like module containing, mucin-like, hormone receptor-like sequence 1	TCACCAGCAG [G/C] GTCTGCCCTG	M	G	C	R	S
G646u8	WIAP-12336	X81479	1308	EMR1, egf-like module containing, mucin-like, hormone receptor-like sequence 1	CTCAGCAANT [G/A] TCACTCCGGC	M	G	A	V	I
G646u9	WIAP-12337	X81479	1285	EMR1, egf-like module containing, mucin-like, hormone receptor-like sequence 1	ACACTGGCAT [C/T] TTTTGGAA	M	C	T	S	F
G646u10	WIAP-12338	X81479	2026	EMR1, egf-like module containing, mucin-like, hormone receptor-like sequence 1	GACAAAGA [C/T] GGGCTGGCC	M	C	T	T	M
G647u1	WIAP-12339	HTS190	174	RARA, retinoic acid receptor, alpha	TGCCTCCCTA [C/T] GCCTTCTTCT	S	C	T	Y	Y
G648a1	WIAP-13332	HT0070	469	retinoic acid receptor, beta	AACGTGAGCC [A/G] GGAGCAGCGT	-	A	G	-	-
G648a2	WIAP-13333	HT0070	532	retinoic acid receptor, beta	ATTGTTTTTA [A/G] GGTGAGAAAT	-	A	G	-	-



G650u1	WIAF-12323	X52773	862	RXRA, retinoid X receptor, alpha	CTGCGGAGC [G/A] ACCCTGTAC	M	G	A	D	N
G650u2	WIAF-12341	X52773	102	RXRA, retinoid X receptor, alpha	TCTTGGGCT [C/T] GATTTCTCA	S	C	T	L	L
G650u3	WIAF-12348	X52773	673	RXRA, retinoid X receptor, alpha	GGCATTGGG [A/G] TGAAGCGGA	M	A	G	M	V
G650u4	WIAF-12349	X52773	902	RXRA, retinoid X receptor, alpha	GACAAACAGC [T/C] TTTCACCTG	M	T	C	L	P
G653a1	WIAF-13326	HT1458	439	RARB, retinoic acid receptor, beta	AGGAGAAAGC [T/C] CTCAAAGCAT	S	T	C	A	A
G655a1	WIAF-13327	J05252	1158	PCSK2, proprotein convertase subtilisin/kexin type 2	CCTTCAGCA [C/T] GGGAGGAAA	S	C	T	N	N
G655a2	WIAF-13334	J05252	678	PCSK2, proprotein convertase subtilisin/kexin type 2	CCTATCCTTA [C/A] CCTCGGTACA	N	C	A	Y	*
G655a3	WIAF-13335	J05252	744	PCSK2, proprotein convertase subtilisin/kexin type 2	TTTCTGCTGC [C/T] GCCAACAAACA	S	C	T	A	A
G658u1	WIAF-11856	J02943	971	CBG, corticosteroid binding globulin	TCTATGACCT [T/C] GGAGATGTGC	S	T	C	L	L
G658u2	WIAF-13407	J02943	771	CBG, corticosteroid binding globulin	CCTTCATGAC [T/G] CAGAGCTCCC	M	T	G	S	A
G658u3	WIAF-13408	J02943	773	CBG, corticosteroid binding globulin	TTTATGACTC [A/G] GAGTCCCT	S	A	G	S	S
G658u4	WIAF-13409	J02943	1046	CBG, corticosteroid binding globulin	TCACCCAGGA [C/T] GCCCAGCTGA	S	C	T	D	D
G663u1	WIAF-13400	HT3157	1202	TPO, thyroid peroxidase	CGCCACGCG [G/A] CCTGGGCT	S	G	A	A	A
G663u2	WIAF-13401	HT3157	1282	TPO, thyroid peroxidase	GGCCGGCCA [G/C] CGAGTCCCC	M	G	C	S	T
G668a1	WIAF-13350	U53506	350	DIO2, deiodinase, iodothyronine, type II	TCGATGCTTA [C/A] AAACAGGTGA	N	C	A	Y	*
G668a2	WIAF-13351	U53506	354	DIO2, deiodinase, iodothyronine, type II	TGCCTACAAA [C/A] AGGTGAAATT	M	C	A	Q	K
G668a3	WIAF-13352	U53506	408	DIO2, deiodinase, iodothyronine, type II	TGCTCCACT [A/G] CAGAGGAGG	M	A	G	T	A
G673a1	WIAF-13328	MS7464	1723	Human ret proto-oncogene mRNA for tyrosine kinase.	CGAGCTGGG [G/A] AGCCCCGGGG	M	G	A	B	K
G673a2	WIAF-13336	MS7464	1186	Human ret proto-oncogene mRNA for tyrosine kinase.	GGCTGGCCA [T/A] TTGCCAGAT	M	T	A	F	I

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G673a3	WIAF-13337	M57464	1227	Human ret proto-oncogene mRNA for tyrosine kinase.	ACTGCCAGGC [G/A] TTCAGTGGCA	S	G	A	A	A
G673a4	WIAF-13338	M57464	2118	Human ret proto-oncogene mRNA for tyrosine kinase.	TTGGAAAAC [T/A] CTAGGAGAAG	S	T	A	T	T
G673a5	WIAF-13339	M57464	2238	Human ret proto-oncogene mRNA for tyrosine kinase.	CGAGTGAGCT [T/G] CGAGACCTGC	S	T	G	L	L
G678a1	WIAF-13353	D49492	1439	GDF10, growth differentiation factor 10	TCGGCTGGAA [T/A] GAATGGATAA	M	T	A	N	K
G68u1	WIAF-10434	HT1115	1214	ERCC3, excision repair cross-complementing rodent repair deficiency, complementation group B 3 (xeroderma pigmentosum group B complementing)	CTGTGGAGCA [G/A] TGGAAAGCCC	S	G	A	Q	Q
G68u2	WIAF-10435	HT1115	1155	ERCC3, excision repair cross-complementing rodent repair deficiency, complementation group B 3 (xeroderma pigmentosum group B complementing)	TGTGACTGCT [G/C] CATGCACTGT	M	G	C	A	P
G68u3	WIAF-10436	HT1115	1327	ERCC3, excision repair cross-complementing rodent repair deficiency, complementation group B 3 (xeroderma pigmentosum group B complementing)	AGCACCTACT [C/T] CATGCTGGCC	M	C	T	S	F
G68u4	WIAF-10461	HT1115	926	ERCC3, excision repair cross-complementing rodent repair deficiency, complementation group B 3 (xeroderma pigmentosum group B complementing)	AGGAATGAT [T/C] GAGGAAGTCC	S	T	C	I	I
G68u5	WIAF-10464	HT1115	1430	ERCC3, excision repair cross-complementing rodent repair deficiency, complementation group B 3 (xeroderma pigmentosum group B complementing)	AAGTGCACAC [C/T] ATACCAGCCA	S	C	T	T	T

G684a1	WIAF-13359	X51801			BMP7, bone morphogenetic protein 712 7 (osteogenic protein 1)	GTTTATCAGG [T/G] GCTCCAGGAG	M	T	G	V	G
G684a2	WIAF-13360	X51801			BMP7, bone morphogenetic protein 719 7 (osteogenic protein 1)	AGGTGCTCCA [G/A] GAGCATTGG	S	G	A	Q	Q
G684a3	WIAF-13361	X51801			BMP7, bone morphogenetic protein 796 7 (osteogenic protein 1)	GGCTGGCTGG [T/G] GTTGCACATC	M	T	G	V	G
G684a4	WIAF-13362	X51801			BMP7, bone morphogenetic protein 862 7 (osteogenic protein 1)	GGCTGTCAGC [T/G] CTCGGTGGAG	M	T	G	L	R
G684a5	WIAF-13363	X51801			BMP7, bone morphogenetic protein 658 7 (osteogenic protein 1)	ATCTACAAGG [A/G] CTACATCCGG	M	A	G	D	G
G684a6	WIAF-13834	X51801			BMP7, bone morphogenetic protein 1421 7 (osteogenic protein 1)	GCCACTAGCT [C/T] CTCGAGAAAT	-	C	T	-	-
G685a1	WIAF-13329	D89675			BMPRII, bone morphogenetic protein receptor, type IB	GTTCCCTTTA [T/G] GATTATCTGA	N	T	G	Y	*
G685a2	WIAF-13330	D89675			BMPRII, bone morphogenetic protein receptor, type IB	GCTAAATCAA [T/C] GCTGAAGTTA	M	T	C	M	T
G685a3	WIAF-13331	D89675			BMPRII, bone morphogenetic protein receptor, type IB	TATCAGACAG [T/G] GTTGTATGAGG	M	T	G	V	G
G685a4	WIAF-13340	D89675			BMPRII, bone morphogenetic protein receptor, type IB	TCCTTATCAT [G/A] ACCTAGTGGC	M	G	A	D	N
G685a5	WIAF-13341	D89675			BMPRII, bone morphogenetic protein receptor, type IB	GTTACGCCCC [T/G] CATTCGCCAA	M	T	G	S	A
G685a6	WIAF-13342	D89675			BMPRII, bone morphogenetic protein receptor, type IB	TGTTGGACGA [G/A] AGCTTGAACA	S	G	A	E	E
G686a1	WIAF-13816	Z48923			BMPRII, bone morphogenetic protein receptor, type II (serine/threonine kinase)	AAATTGGCA [G/A] CAAGCACAAA	M	G	A	S	N

G686u2	WIAF-13817	248923		BMP2, bone morphogenetic protein receptor, type II (serine/threonine kinase)	2749	TGGAGTTGCC[A/T]AGATGAATAC	N	A	T	K	*
G687a1	WIAF-13343	HT1455		626 CALB1, calbindin 1, (28kD)		ATGATCAGGA[C/T]GGCAATGGAT	S	C	T	D	D
G696u1	WIAF-11839	HT27700		1075 calcium-sensing receptor		GGGCACAAAT[G/C]CAGCTGATGA	M	G	C	A	P
G696u2	WIAF-11840	HT27700		1551 calcium-sensing receptor		TACTGTGGA[C/T]ACCTTTCTGA	S	C	T	D	D
G696u3	WIAF-11841	HT27700		1688 calcium-sensing receptor		TACGGATAT[C/T]CTACAATGTG	M	C	T	S	F
G696u4	WIAF-11842	HT27700		1698 calcium-sensing receptor		CCTACAATGT[G/T]TACTTAGCAG	S	G	T	V	V
G696u5	WIAF-11858	HT27700		1767 calcium-sensing receptor		GGAGAGGGCT[C/T]TTCACCAATG	S	C	T	L	L
G696u6	WIAF-11859	HT27700		1689 calcium-sensing receptor		TACGGATATC[C/T]TACAATGTGT	S	C	T	S	S
G696u7	WIAF-11860	HT27700		2541 calcium-sensing receptor		TCTGTCTGTG[C/T]ATCTCATGCA	S	C	T	C	C
G696u8	WIAF-11861	HT27700		2581 calcium-sensing receptor		TGCTCTCTG[G/A]TGTTTGAGCC	M	G	A	V	M
G696u9	WIAF-11863	HT27700		3159 calcium-sensing receptor		TCTCCCGAA[G/C]CGTCCAGCA	M	G	C	K	N
G696u10	WIAF-11872	HT27700		562 calcium-sensing receptor		TCCTATTTCAT[T/A]TTGGACTAGC	M	T	A	F	I
G696u11	WIAF-11878	HT27700		2941 calcium-sensing receptor		CATTCCAGCC[T/G]ATGCCAGCAC	M	T	G	Y	D
G696u12	WIAF-13386	HT27700		1145 calcium-sensing receptor		AGGATATCT[G/A]CATCGACTTC	M	G	A	C	Y
G696u13	WIAF-13395	HT27700		670 calcium-sensing receptor		GATATTGCCC[A/G]TAGAGGGAGAT	M	A	G	I	V
G696u14	WIAF-13396	HT27700		2243 calcium-sensing receptor		TTCTGGTCCA[A/G]TGAGAACCCAC	M	A	G	N	S
G696u15	WIAF-13397	HT27700		2742 calcium-sensing receptor		AGCTGGAGGA[T/C]GAGATCATCT	S	T	C	D	D
G698u1	WIAF-13547	X61598		393 CBP1, collagen-binding protein 1		TCAGCAACTC[G/C]ACGGCGCGCA	S	G	C	S	S
G698u2	WIAF-13549	X61598		628 CBP1, collagen-binding protein 1		CGGCGCCTG[C/T]TAGTCAACGC	S	C	T	L	L
G698u3	WIAF-13550	X61598		1230 CBP1, collagen-binding protein 1		GCGCTCCCT[G/A]CTATTTCATTG	S	G	A	L	L
G701u1	WIAF-12382	HT27657		706 CGRP type I receptor		AACGATGTG[C/A]AGCAGGAACT	M	C	A	A	E
G701u2	WIAF-12391	HT27657		841 CGRP type I receptor		TGGACAAATT[A/T]TACCCAGTGT	M	A	T	Y	F
G704u1	WIAF-14046	X60382		COL10A1, collagen, type X, alpha 1 (Schmid metaphyseal chondrodysplasia)	1396	AGGCATTCCA[G/A]GATTCCCTGG	M	G	A	G	R
G704u2	WIAF-14070	X60382		COL10A1, collagen, type X, alpha 1 (Schmid metaphyseal chondrodysplasia)	1648	TGCCAACCCAG[G/C]GGGTAAACAGG	M	G	C	G	R

G704u3	WIAP-14071	X60382	1824	COL10A1, collagen, type X, alpha 1 (Schmid metaphyseal chondrodysplasia)	COL10A1, collagen, type X, alpha 1 (Schmid metaphyseal chondrodysplasia)	CATACCACGT [G/C] CATGTGAAG	S	G	C	V	V
G704u4	WIAP-14072	X60382	1582	COL10A1, collagen, type X, alpha 1 (Schmid metaphyseal chondrodysplasia)	COL10A1, collagen, type X, alpha 1 (Schmid metaphyseal chondrodysplasia)	AGTCATGCCT [G/C] AGGGTTTAT	M	G	C	E	Q
G705a1	WIAP-13228	J04177	6861	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	AGAGAAAC [T/A] GTGACAATGA	S	T	A	T	T
G705a2	WIAP-13229	J04177	6981	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	TGACAATGAT [T/A] GTTGATTGTA	S	T	A	I	I
G705a3	WIAP-13230	J04177	8881	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	TAGTCCAGAC [T/A] GTGACTCTTC	M	T	A	C	S
G705a4	WIAP-13231	J04177	8941	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	AGACTGTGAC [T/A] CTTCCAGCAC	M	T	A	S	T
G705a5	WIAP-13232	J04177	6511	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	TGACGGGAAG [T/A] GGCATCGGT	M	T	A	W	R
G705a6	WIAP-13233	J04177	6611	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	TGGCATCGGG [T/A] AGCAATCAGC	M	T	A	V	S
G705a7	WIAP-13234	J04177	15971	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	CGTCTGGCT [T/C] ACCAGGGGCT	M	T	C	L	S
G705a8	WIAP-13235	J04177	27451	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	TGGGTTTCCA [G/A] GTGCCAATGG	M	G	A	G	S
G705a9	WIAP-13236	J04177	43851	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	GTCCAGGAGG [T/A] CTTGGGGCA	S	T	A	G	G
G705a10	WIAP-13237	J04177	45761	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	GAAAAAGGTG [A/T] CCGAGGGCTC	M	A	T	D	V
G705a11	WIAP-13238	J04177	43061	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	GCTAAGGGGG [A/C] AGCAGGTGCA	M	A	C	E	A
G705a12	WIAP-13239	J04177	48371	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	AGACATCTG [A/G] AGGCATCAA	M	A	G	E	G
G705a13	WIAP-13240	J04177	49311	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	AACAAGACAT [C/T] GAGCATATGA	S	C	T	I	I
G705a14	WIAP-13346	J04177	2991	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	AAGCACTAGA [T/G] TTTCACAATT	M	T	G	D	E
G705a15	WIAP-13347	J04177	22251	COL11A1, collagen, type XI, alpha	COL11A1, collagen, type XI, alpha	GGGAGCCTGG [G/C] CCTCCAGGTC	S	G	C	G	G

G705u16	WIAP-13679	J04177	5493	COL11A1, collagen, type XI, alpha 1	AAATTGATCAA [G/A] TACCTATTGT	M	G	A	V	I
G705u17	WIAP-13700	J04177	3484	COL11A1, collagen, type XI, alpha 1	GGAGTTCAAG [G/A] TCTGTGGT	M	G	A	G	D
G705u18	WIAP-13709	J04177	5392	COL11A1, collagen, type XI, alpha 1	GAGATGTCCT [A/T] TGCATATAAT	M	A	T	Y	F
G707u1	WIAP-12363	U32169	4996	COL11A2, collagen, type XI, alpha 2	TCCCTGAG [C/T] TCGTGGGC	M	C	T	L	F
G707u2	WIAP-12374	U32169	3580	COL11A2, collagen, type XI, alpha 2	CAATGGCCT [G/A] ATGGCCACA	M	G	A	D	N
G707u3	WIAP-12385	U32169	2059	COL11A2, collagen, type XI, alpha 2	GCCTGGCTCA [G/A] ACGACCCCC	M	G	A	D	N
G708a1	WIAP-13354	U73778	1885	COL12A1, collagen, type XII, alpha 1	GCCTCTCTC [C/T] TGCAGAGCC	M	C	T	P	L
G708a2	WIAP-13355	U73778	3630	COL12A1, collagen, type XII, alpha 1	TGTTGGACAA [G/A] AAATGACAAC	M	G	A	E	K
G708a3	WIAP-13356	U73778	3905	COL12A1, collagen, type XII, alpha 1	GCTTGTGCA [A/T] GCTGTGGCA	M	A	T	Q	H
G708a4	WIAP-13357	U73778	7051	COL12A1, collagen, type XII, alpha 1	ATTCCACCAG [C/A] CCGGATGTA	M	C	A	A	D
G708a5	WIAP-13358	U73778	8036	COL12A1, collagen, type XII, alpha 1	AAGAAGTAAA [G/A] ACATTATTTT	S	G	A	K	K
G708a6	WIAP-13364	U73778	1461	COL12A1, collagen, type XII, alpha 1	TGGCTCTAT [A/T] GCATTGGAT	M	A	T	S	C
G708a7	WIAP-13365	U73778	2344	COL12A1, collagen, type XII, alpha 1	ATTACTTGA [C/T] TCAAGCTCCA	M	C	T	T	I
G708a8	WIAP-13366	U73778	5207	COL12A1, collagen, type XII, alpha 1	CAGATAGAT [G/A] GAGACCATCT	M	G	A	M	I
G708a9	WIAP-13367	U73778	6592	COL12A1, collagen, type XII, alpha 1	GAGCCATGG [A/T] AGCCTTTGTT	M	A	T	E	V
G708a10	WIAP-13368	U73778	7434	COL12A1, collagen, type XII, alpha 1	CCAGGATGAG [G/A] TCAAGAGGC	M	G	A	V	I
G708a11	WIAP-13369	U73778	9108	COL12A1, collagen, type XII, alpha 1	ACCTCGGGG [C/G] TGCCTGGCC	M	C	G	L	V
G708a12	WIAP-13370	U73778	9111	COL12A1, collagen, type XII, alpha 1	TCGGGGGCTG [C/T] CTGGGCCCC	M	C	T	P	S
G708a13	WIAP-13371	U73778	9196	COL12A1, collagen, type XII, alpha 1	CCCCCTGGCC [G/A] TCCTGGAAC	M	G	A	R	H

G708u14	WIAF-13972	U73778	3044	COL12A1, collagen, type XII,	alpha 1	CAGTATTGTC [C/A] ACTTACAGCA	S	C	A	A	A
G708u15	WIAF-13977	U73778	5853	COL12A1, collagen, type XII,	alpha 1	TGTGACTGTA [G/C] TTCCCGTTTA	M	G	C	V	L
G710u1	WIAF-12371	D38163	3082	COL19A1, collagen, type XIX,	alpha 1	AGAAACAAG [G/T] GCTCCATGGG	M	G	T	G	C
G710u2	WIAF-12388	D38163	2089	COL19A1, collagen, type XIX,	alpha 1	TCCAGGGACT [C/T] CAGGGAATGA	M	C	T	P	S
G711u1	WIAF-12360	L25286	1449	COL15A1, collagen, type XV, alpha	1	TGTGGTCCA [A/G] GCAGTGAAGA	M	A	G	S	G
G711u2	WIAF-12372	L25286	4001	COL15A1, collagen, type XV, alpha	1	ATATTCCAAT [A/G] TACTCCTTTG	M	A	G	I	M
G711u3	WIAF-12373	L25286	3867	COL15A1, collagen, type XV, alpha	1	CCATTGCAA [G/T] ATCTGTCCAC	M	G	T	D	Y
G711a4	WIAF-13372	L25286	395	COL15A1, collagen, type XV, alpha	1	CCAGCAGCAC [C/T] CGTGGTGGCG	S	C	T	T	T
G711a5	WIAF-13373	L25286	3101	COL15A1, collagen, type XV, alpha	1	AAGCGACCA [G/A] GGAGCCCGAGG	S	G	A	Q	Q
G712u1	WIAF-13619	M92642	3608	COL16A1, collagen, type XVI,	alpha 1	GGCGACCAAGG [G/A] ATTTCAAGGC	M	G	A	G	E
G712u2	WIAF-13620	M92642	4944	COL16A1, collagen, type XVI,	alpha 1	CCATGAAAC [C/T] ATGAAGGGGC	S	C	T	T	T
G712u3	WIAF-13621	M92642	4707	COL16A1, collagen, type XVI,	alpha 1	CCAAAGGTGA [A/C] AAAGGGGACA	M	A	C	E	D
G712u4	WIAF-13654	M92642	421	COL16A1, collagen, type XVI,	alpha 1	GCCCACGCGA [C/A] GAGTATTCCC	S	C	A	R	R
G712u5	WIAF-13655	M92642	444	COL16A1, collagen, type XVI,	alpha 1	GGGGTCTCCC [G/A] CAGGAGTTTG	S	G	A	P	P
G712u6	WIAF-13656	M92642	338	COL16A1, collagen, type XVI,	alpha 1	CTCATGAAGA [A/C] GTCTGCCATC	M	A	C	K	T
G712u7	WIAF-13862	M92642	3227	COL16A1, collagen, type XVI,	alpha 1	CCTGGTCTTC [C/T] GGGATTGCCA	M	C	T	P	L
G712u8	WIAF-13863	M92642	3199	COL16A1, collagen, type XVI,	alpha 1	TCCTGGCTGT [G/T] TTGGGAGCCC	M	G	T	V	F
G712u9	WIAF-13878	M92642	318	COL16A1, collagen, type XVI,	alpha 1	ACCTCATCCA [C/T] CGACTCAGCC	S	C	T	H	H
G712u10	WIAF-13882	M92642	1346	COL16A1, collagen, type XVI,	alpha 1	ACAGGCGAGA [A/G] GGGCCAGAAA	M	A	G	K	R

G712u1	WIAF-13883	M92642	1309	COL16A1, collagen, type XVI, alpha 1	GTGAGGAGCT [C/T] TGGACCCCTC	S	C	T	L	L
G715a1	WIAF-13344	274615	3504	COL1A1, collagen, type I, alpha 1	TCCTGGTGAA [C/G] AAGGTCCCTC	M	C	G	Q	E
G717u1	WIAF-12639	274616	3988	COL1A2, collagen, type I, alpha 2	ATGAGGAGAC [T/C] GGCACCTGA	S	T	C	T	T
G720u1	WIAF-12367	X14420	3494	COL3A1, collagen, type III, alpha 1 (Ehlers-Danlos syndrome type IV, autosomal dominant)	GGTCAATCG [G/A] CAGTCCAGGA	M	G	A	G	D
G720u2	WIAF-12383	X14420	3035	COL3A1, collagen, type III, alpha 1 (Ehlers-Danlos syndrome type IV, autosomal dominant)	GGTCTCAAGG [G/A] TGAAGTGGG	M	G	A	G	D
G720a3	WIAF-13374	X14420	214	COL3A1, collagen, type III, alpha 1 (Ehlers-Danlos syndrome type IV, autosomal dominant)	TCTTGGTCAG [T/C] CCTATGCGGA	M	T	C	S	P
G720a4	WIAF-13375	X14420	1953	COL3A1, collagen, type III, alpha 1 (Ehlers-Danlos syndrome type IV, autosomal dominant)	CTGGACCTCA [A/G] GGACCCCCAG	S	A	G	Q	Q
G720a5	WIAF-13376	X14420	2194	COL3A1, collagen, type III, alpha 1 (Ehlers-Danlos syndrome type IV, autosomal dominant)	TAGAGGTGGA [G/A] CTGCTCCCCC	M	G	A	A	T
G720a6	WIAF-13377	X14420	3731	COL3A1, collagen, type III, alpha 1 (Ehlers-Danlos syndrome type IV, autosomal dominant)	GGGATTGGAG [G/A] TGA AAAAGCT	M	G	A	G	D
G722u1	WIAF-14132	HT3162	1402	COL4A2, collagen, type IV, alpha 2	GAGATTGGCG [C/T] GACTGGTGAT	M	C	T	A	V
G724a1	WIAF-12120	X81053	38924	COL4A4, collagen, type IV, alpha 4	CTCGTGGAAA [G/A] AAGGTCCCC	S	G	A	K	K
G724a2	WIAF-12121	X81053	41874	COL4A4, collagen, type IV, alpha 4	GAAAGGACCA [A/G] TGGGATTCCC	M	A	G	M	V
G724a3	WIAF-12122	X81053	38024	COL4A4, collagen, type IV, alpha 4	ATGATGTGGG [G/A] CCACCTGGTC	S	G	A	G	G



G724a4	WIAP-12123	X81053	1838	COL4A4, collagen, type IV, alpha 4	ACCAGGAAG[C/A]ATGTCCTC	M	C	A	H	N
G724u5	WIAP-12364	X81053	376	COL4A4, collagen, type IV, alpha 4	CTGTTGCCA[C/T]TGTGTCCTG	S	C	T	H	H
G724u6	WIAP-12365	X81053	2018	COL4A4, collagen, type IV, alpha 4	TCCAGGGAT[C/G]ATGAAGATGC	M	C	G	H	D
G724u7	WIAP-12366	X81053	4756	COL4A4, collagen, type IV, alpha 4	GCCTCCCGT[A/G]TTTAGCAGC	S	A	G	V	V
G724u8	WIAP-12377	X81053	3595	COL4A4, collagen, type IV, alpha 4	CTGGACCAAC[C/G]GGTGCCAG	S	A	G	P	P
G724u9	WIAP-12378	X81053	3516	COL4A4, collagen, type IV, alpha 4	GGAGCATCCG[G/C]AGAGCAGGC	M	G	C	G	A
G724u10	WIAP-12379	X81053	4288	COL4A4, collagen, type IV, alpha 4	CTGGTCTTCC[A/G]GGTCCAGAG	S	A	G	P	P
G724u11	WIAP-12380	X81053	5140	COL4A4, collagen, type IV, alpha 4	GCCACTTTT[C/A]GCAATAAGT	M	C	A	F	L
G724u12	WIAP-12387	X81053	207	COL4A4, collagen, type IV, alpha 4	GACTTGCTG[C/T]GATGTGCT	-	C	T	-	-
G727u1	WIAP-12362	D90279	5135	COL5A1, collagen, type V, alpha 1	TTCAAGGTTT[A/T]CTGCAACTTC	M	A	T	Y	F
G727u2	WIAP-12369	D90279	4686	COL5A1, collagen, type V, alpha 1	AACAGGGTAT[C/T]ACTGTCTT	S	C	T	I	I
G727u3	WIAP-12370	D90279	4608	COL5A1, collagen, type V, alpha 1	TCGGTCCTCC[G/C]GGTGAACAGG	S	G	C	P	P
G727a4	WIAP-13300	D90279	2034	COL5A1, collagen, type V, alpha 1	ACGGCTGGC[T/A]GGTTGCCAG	S	T	A	A	A
G727a5	WIAP-13301	D90279	2073	COL5A1, collagen, type V, alpha 1	GTGACCTGG[T/C]CTTCCGGCC	S	T	C	G	G
G727a6	WIAP-13302	D90279	3763	COL5A1, collagen, type V, alpha 1	CGGCGAGAAA[G/A]GTGATGAAGG	M	G	A	G	S
G729u1	WIAP-11844	L02870	2345	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	ATGACTGGA[G/A]CCAGATACTG	S	G	A	E	E

G729u2	WIAP-11845	L02870	3083	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	TATCCTGGCG [G/A] CCACTCAGAG	S	G	A	R	R
G729u3	WIAP-11846	L02870	3031	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	GACTCGTGA [C/T] TTGGCCTGG	M	C	T	T	I
G729u4	WIAP-11851	L02870	1289	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	CGACTATGA [G/T] GTGACCGTGA	M	G	T	E	D
G729u5	WIAP-11852	L02870	1032	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	CCAAGTGACT [G/T] TGATTGCCCT	M	G	T	V	L
G729u6	WIAP-11853	L02870	1897	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	CGCCGGGAGC [C/T] GGAAACTCCA	M	C	T	P	L
G729u7	WIAP-11854	L02870	1827	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	GCTTAGCTAC [A/T] CTGTGCGGGT	M	A	T	T	S
G729u8	WIAP-11855	L02870	1893	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	TGTCCGCGG [G/A] AGCCGGAAC	M	G	A	E	K

G729u9	WIAP-11864	L02870	2142	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	GGGCCCTGCT (G/A) CAGTCATCGT	M	G	A	A	T
G729u10	WIAP-11865	L02870	2353	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	GAGCCAGATA (C/T) TGAATATACG	M	C	T	T	I
G729u11	WIAP-11866	L02870	2221	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	TCATCTGTCA (C/T) CATTACCTGG	M	C	T	T	I
G729u12	WIAP-11869	L02870	6585	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	ACCAGGAGAG (C/T) GTGGTATGGC	M	C	T	R	C
G729u13	WIAP-11870	L02870	8169	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	GGGTGACCGA (G/T) GCTTTGACGG	M	G	T	G	C
G729u14	WIAP-11877	L02870	438	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	CGCCATCCGT (G/A) AGCTTAGCTA	M	G	A	E	K
G729u15	WIAP-11882	L02870	3481	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	AGCATCCGTG (A/T) CATGCCCTAC	M	A	T	D	V

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G729u16	WIAF-11883	L02870	5654	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	ACGGAGAACC [T/C] GGGGACCCCTG	S	T	C	P	P
G729u17	WIAF-11884	L02870	7124	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	TGCCAGGGCC [G/C] CGAGGGGAGA	S	G	C	P	P
G729u18	WIAF-11885	L02870	7757	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	GCTTGGATGG [T/C] GACAAAGGAC	S	T	C	G	G
G729u19	WIAF-13389	L02870	1615	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	ACCGTGGTTC [C/T] CACTGGACCA	M	C	T	P	L
G729u20	WIAF-13390	L02870	2930	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	TCTTAGGGCC [G/A] GCTGGAGAAG	S	G	A	P	P
G729u21	WIAF-13399	L02870	5145	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	CCAGGGAGAT [C/T] CTGGAGAGGA	M	C	T	P	S
G729u22	WIAF-13411	L02870	3472	COL7A1, collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)	ATCTTGCAAA [G/A] GATCCGTGAC	M	G	A	R	K
G730a1	WIAF-13303	X57527	305	COL8A1, collagen, type VIII, alpha 1	ATGGGCAAGG [A/G] AGCCGTTCCC	M	A	G	E	G
G732u1	WIAF-12616	M95610	9362	COL9A2, collagen, type IX, alpha 2	CAGGCGGGAC [A/G] GCCCGGAAGT	S	A	G	T	T

G732u2	WIAP-12617	M95610	6962	COL9A2, collagen, type IX, alpha 2	AAGGAGAGAG [C/T] GGGCCCTCAT	S	C	T	D	D
G732u3	WIAP-12619	M95610	12882	COL9A2, collagen, type IX, alpha 2	AAGTGGGTGA [C/T] CCAGGGGTGG	M	C	T	P	S
G732u4	WIAP-12620	M95610	9622	COL9A2, collagen, type IX, alpha 2	CCACCAGGC [C/G] TAGCGGTGT	M	C	G	P	R
G737u1	WIAP-13394	M13436	?	INHBA, inhibin, beta A (activin A, activin AB alpha polypeptide)	TGCTCCCTG [G/T]	?	G	T		
G738u1	WIAP-13383	M58549	183	MGP, matrix Gla protein	ATGGAGAGCT [A/G] AGTCCNAGA	M	A	G	K	E
G738u2	WIAP-13384	M58549	330	MGP, matrix Gla protein	GGCCGAGGG [A/G] CCAAATGAGA	M	A	G	T	A
G739u1	WIAP-11867	U94332	862	TNFRSF11B, tumor necrosis factor receptor superfamily, member 11b (osteoprotegerin)	TGCTGAAGTT [A/G] TGAACATC	S	A	G	L	L
G739u2	WIAP-11874	U94332	1244	TNFRSF11B, tumor necrosis factor receptor superfamily, member 11b (osteoprotegerin)	GTATCAGAG [T/C] TATTTTAGA	S	T	C	L	L
G743u1	WIAP-13402	HT847	1669	PTHr1, parathyroid hormone receptor 1	CCCTGGAGAC [C/A] CTCGAGACCA	S	C	A	T	T
G747u1	WIAP-12414	J03040	123	SPARC, secreted protein, acidic, cysteine-rich (osteonectin)	CTCAGCAAGA [A/G] GCCCTGCCTG	S	A	G	E	E
G748u1	WIAP-12628	HT0157	117	VDR, vitamin D (1,25-dihydroxyvitamin D3) receptor	CCTTCAGGGA [T/C] GGAGGCAATG	M	T	C	M	T
G748u2	WIAP-12629	HT0157	1171	VDR, vitamin D (1,25-dihydroxyvitamin D3) receptor	CCGCGCTGAT [T/C] GAGGCCATCC	S	T	C	I	I
G748u3	WIAP-12640	HT0157	172	VDR, vitamin D (1,25-dihydroxyvitamin D3) receptor	TTGACCGGAA [C/T] GTGCCCGGA	S	C	T	N	N
G749u1	WIAP-11862	HT3734	679	osteopontin, alt. transcript 1	ATCACCTCAC [A/T] CATGAAAGC	M	A	T	H	L
G749u2	WIAP-11875	HT3734	386	osteopontin, alt. transcript 1	AAGATGATGA [A/G] GACCATGTGG	S	A	G	D	D
G749u3	WIAP-11876	HT3734	419	osteopontin, alt. transcript 1	CCATTGACTC [G/A] AACGACTCTG	S	G	A	S	S

G749a4	WIAF-12084	HT3734	171	osteopontin, alt. transcript 1	TAACAGGCT[G/A]ATTCCTGGAAG	M	G	A	D	N
G749u5	WIAF-13387	HT3734	738	osteopontin, alt. transcript 1	CCAGGACCTG[A/C]ACGCCCTTC	M	A	C	N	H
G749u6	WIAF-13388	HT3734	716	osteopontin, alt. transcript 1	CATCAAGGC[C/A]ATCCCGTTG	S	C	A	A	A
G751u1	WIAF-12631	HT5036	410	ADM, adrenomedullin	GACAGAGTC[C/G]GGATGCCGCC	M	C	G	P	R
G752u1	WIAF-11843	HT1782	1405	CHGA, chromogranin A (parathyroid secretory protein 1)	CGGCCATTGA[A/G]GCAGAGCTGG	S	A	G	E	E
G752u2	WIAF-11873	HT1782	1187	CHGA, chromogranin A (parathyroid secretory protein 1)	GGACAACCGG[G/A]ACAGTTCCAT	M	G	A	D	N
G754a1	WIAF-13382	K02043	663	NPPA, natriuretic peptide precursor A	GTACAATGCC[G/A]TGTCACAGGC	M	G	A	V	M
G756u1	WIAF-12395	HT3508	2086	SCNN1A, sodium channel, nonvoltage-gated 1 alpha	CAGTTCTCC[A/G]CCTGTCTCT	M	A	G	T	A
G757u1	WIAF-12420	HT28563	797	SCNN1B, sodium channel, nonvoltage-gated 1, beta (Liddle syndrome)	CCTGCAGGCC[A/C]CCACATCTT	M	A	C	T	P
G757u2	WIAF-12421	HT28563	1006	SCNN1B, sodium channel, nonvoltage-gated 1, beta (Liddle syndrome)	GAACTGAATT[C/T]GGCCTGAAGT	S	C	T	F	F
G757u3	WIAF-12430	HT28563	1768	SCNN1B, sodium channel, nonvoltage-gated 1, beta (Liddle syndrome)	TCATCGACTT[T/C]GTGTGGATCA	S	T	C	F	F
G757u4	WIAF-12494	HT28563	662	SCNN1B, sodium channel, nonvoltage-gated 1, beta (Liddle syndrome)	AAGCAGCTCA[G/C]CATCAGAAA	M	G	C	A	P
G757u5	WIAF-12506	HT28563	1091	SCNN1B, sodium channel, nonvoltage-gated 1, beta (Liddle syndrome)	GATGCTTCAC[G/C]AGCAGAGGTC	M	G	C	E	Q
G757u6	WIAF-12507	HT28563	1452	SCNN1B, sodium channel, nonvoltage-gated 1, beta (Liddle syndrome)	ACCTGCATTG[G/T]CATGTGCAAG	M	G	T	G	V
G758u1	WIAF-12621	HT27856	415	SCNN1D, sodium channel, nonvoltage-gated 1, delta	CGGGAACCCA[C/T]GTGCGCCGAG	M	C	T	R	C
G758u2	WIAF-12632	HT27856	325	SCNN1D, sodium channel, nonvoltage-gated 1, delta	CCTCTTTGAG[C/T]GTCAGTGGCA	M	C	T	R	C

G758u3	WIAF-12634	HT27856	879	SCNN1D, sodium channel, nonvoltage-gated 1, delta	ATGGCGTCTG [G/A] ACAGCTCAGC	N	G	A	W	*
G758u4	WIAF-12635	HT27856	1138	SCNN1D, sodium channel, nonvoltage-gated 1, delta	CGTGGAGGTG [G/C] AGCTGCTACA	M	G	C	E	Q
G762u1	WIAF-12622	HT27531	1850	NPR3, natriuretic peptide receptor C/guanylate cyclase C (atrionatriuretic peptide receptor C)	TAGGAGCTGG [C/T] TTGCTAATGG	S	C	T	G	G
G762u2	WIAF-12623	HT27531	1926	NPR3, natriuretic peptide receptor C/guanylate cyclase C (atrionatriuretic peptide receptor C)	AGAAGAAAGT [A/G] ACCTTGGAA	M	A	G	N	D
G762u3	WIAF-12624	HT27531	1791	NPR3, natriuretic peptide receptor C/guanylate cyclase C (atrionatriuretic peptide receptor C)	CAAATCATCA [G/T] GTGGCCTAGA	M	G	T	G	C
G762u4	WIAF-12636	HT27531	1963	NPR3, natriuretic peptide receptor C/guanylate cyclase C (atrionatriuretic peptide receptor C)	GAAGATTCCA [T/C] CAGATCCCAT	M	T	C	I	T
G763u1	WIAF-12659	HT3183	1633	NPR2, natriuretic peptide receptor B/guanylate cyclase B (atrionatriuretic peptide receptor B)	CTGGGCCCTT [C/T] CCTGATGAAC	M	C	T	S	F
G763u2	WIAF-12678	HT3183	668	NPR2, natriuretic peptide receptor B/guanylate cyclase B (atrionatriuretic peptide receptor B)	TGCCATCACT [T/C] CTGCTGTGG	S	T	C	L	L
G763u3	WIAF-12684	HT3183	2354	NPR2, natriuretic peptide receptor B/guanylate cyclase B (atrionatriuretic peptide receptor B)	TGTTTGAAC [C/T] AAACATATGA	S	C	T	L	L

G764u1	WIAP-12698	HT1221		NPRI, natriuretic peptide receptor A/guanylate cyclase A (atrionatriuretic peptide receptor 3021 A)	CCCCGTTACT [G/T] TCTCTTGGG	M	G	T	C	F
G764u2	WIAP-12708	HT1221		NPRI, natriuretic peptide receptor A/guanylate cyclase A (atrionatriuretic peptide receptor 588 A)	GAGCGCAAG [C/T] GCTCATGCTC	M	C	T	A	V
G764u3	WIAP-12709	HT1221		NPRI, natriuretic peptide receptor A/guanylate cyclase A (atrionatriuretic peptide receptor 1897 A)	GTCCCGTGG [G/A] AGCCTGCAGG	S	G	A	G	G
G765u1	WIAP-10012	HT2456		DCPI, dipeptidyl carboxypeptidase 1 (angiotensin I converting enzyme) 604	GCTGGCACAA [A/G] GCTGCGGCA	S	A	G	N	N
G765u2	WIAP-10014	HT2456		DCPI, dipeptidyl carboxypeptidase 1 (angiotensin I converting enzyme) 2350	TGATGGCCAC [A/G] TCCCGGAAT	S	A	G	T	T
G765u3	WIAP-10025	HT2456		DCPI, dipeptidyl carboxypeptidase 1 (angiotensin I converting enzyme) 1688	CCCACTGCAC [C/A] AGTGTGACAT	M	C	A	Q	K
G765u4	WIAP-10027	HT2456		DCPI, dipeptidyl carboxypeptidase 1 (angiotensin I converting enzyme) 3220	TCCCTTCAG [C/T] TACCTGTCG	S	C	T	S	S
G765u5	WIAP-10028	HT2456		DCPI, dipeptidyl carboxypeptidase 1 (angiotensin I converting enzyme) 3409	TCAGGTACTT [T/C] GTCAGCTTCA	S	T	C	F	F
G765u6	WIAP-10040	HT2456		DCPI, dipeptidyl carboxypeptidase 1 (angiotensin I converting enzyme) 775	AGCCCTTCTA [C/T] CTGAACCTCC	S	C	T	Y	Y



G772u1	WIAP-12626	HT2121		1064	AVPR2, arginine vasopressin receptor 2 (nephrogenic diabetes insipidus)	TCAGCAGCAG [C/T] GGTCTCTCAG	S-	C	T	S	S
G772u2	WIAP-12627	HT2121		998	AVPR2, arginine vasopressin receptor 2 (nephrogenic diabetes insipidus)	CCTTGTGTCT [A/G] CTCATGTTGC	S	A	G	L	L
G773u1	WIAP-12644	HT2141		163	SLC6A6, solute carrier family 6 (neurotransmitter transporter, taurine), member 6	CTAGCAAGAT [C/T] GACTTGTGTC	S	C	T	I	I
G773u2	WIAP-12645	HT2141		445	SLC6A6, solute carrier family 6 (neurotransmitter transporter, taurine), member 6	TCGTCATCCT [G/C] GCGTGGGCCA	S	G	C	L	L
G773u3	WIAP-12655	HT2141		289	SLC6A6, solute carrier family 6 (neurotransmitter transporter, taurine), member 6	TGTTTGGGAG [C/T] GGCCTGCCTG	S	C	T	S	S
G773u4	WIAP-12656	HT2141		382	SLC6A6, solute carrier family 6 (neurotransmitter transporter, taurine), member 6	CCTTGTCTC [T/C] GGTATCGGCT	S	T	C	S	S
G776u1	WIAP-11857	U66088		1457	SLC5A5, solute carrier family 5 (sodium iodide symporter), member 5	TAGAAGACCT [C/T] ATCAAACCTC	S	C	T	L	L
G776u2	WIAP-11871	U66088		2039	SLC5A5, solute carrier family 5 (sodium iodide symporter), member 5	GATTGTGTG [G/C] TGGGACCTCG	M	G	C	W	C
G776u3	WIAP-13398	U66088		1379	SLC5A5, solute carrier family 5 (sodium iodide symporter), member 5	GGCTTTTCT [G/A] GCCTGTGCTT	S	G	A	L	L
G777u1	WIAP-12646	HT27843		4348	SMRT	ATACAATATC [A/G] GCAGGCTGG	M	A	G	S	G
G777u2	WIAP-12654	HT27843		2031	SMRT	CTGAGCTGGG [T/C] AAGCCGCGC	S	T	C	G	G
G777u3	WIAP-12655	HT27843		2052	SMRT	AGAGCCCCCT [G/A] ACCTATGAGG	S	G	A	L	L
G777u4	WIAP-12675	HT27843		2205	SMRT	CTCGTGAGAT [C/T] GCCAAGTCCC	S	C	T	I	I
G778u1	WIAP-14093	HT1449		8212	TG, thyroglobulin	ATCTCGTCTC [T/C] GAAGACATCT	M	T	C	L	P
G778u2	WIAP-14111	HT1449		6033	TG, thyroglobulin	ATGTGAACGA [C/T] GGTGCGATGC	M	C	T	R	W

G778u3	WIAF-14112	HT1449	6894	TG, thyroglobulin	GTATCTCAAT [G/T] TGTTCATCCC	M	G	T	V	L
G778u4	WIAF-14125	HT1449	2375	TG, thyroglobulin	ATGGCCCTCC [T/C] GAGCAGTCT	S	T	C	P	P
G778u5	WIAF-14136	HT1449	1931	TG, thyroglobulin	AGGATGTCCA [A/G] TGCTTTCCG	S	A	G	Q	Q
G783u1	WIAF-12649	X97674	4008	H.sapiens mRNA for transcriptional intermediary factor 2.	CTAGTGGTAT [G/C] CCAGCAACTA	M	G	C	M	I
G783u2	WIAF-12658	X97674	2566	H.sapiens mRNA for transcriptional intermediary factor 2.	GCCTGGCAGT [G/A] AGCTGGACAA	M	G	A	E	K
G783u3	WIAF-12671	X97674	3828	H.sapiens mRNA for transcriptional intermediary factor 2.	CTCTGAGGCC [T/C] GGAGTACCAA	S	T	C	P	P
G785u1	WIAF-13385	HT1291	386	TTR, transthyretin (prealbumin, amyloidosis type I)	CCACGACTC [C/T] GGCCCCGCC	S	C	T	S	S
G787u1	WIAF-12652	HT27477	468	TRIP15: thyroid receptor interacting protein 15	GAAAATTATA [T/C] TTAGAAGAG	S	T	C	Y	Y
G792u1	WIAF-12661	HT27476	265	thyroid receptor interactor 14	CAGCTGGAC [G/A] TGAAGGGC	M	G	A	V	M
G793u1	WIAF-12643	HT5152	458	thyroid receptor interactor 8	GGAAGCTTTT [C/G] AAAGAATGTT	N	C	G	S	*
G794u1	WIAF-12664	HT5136	1110	PSMC5, proteasome (prosome, macropain) 26S subunit, ATPase, 5	GGCTGTGCAC [G/A] GAAGCTGGCA	S	G	A	T	T
G797u1	WIAF-11847	HT3919	140	glutamate receptor 3, flip isoform	CTCAGGAGG [A/G] TTCCCAACA	S	A	G	G	G
G797u2	WIAF-11848	HT3919	759	glutamate receptor 3, flip isoform	GGTTGTGATC [C/T] TAGGGAACA	S	C	T	L	L
G797u3	WIAF-11849	HT3919	1253	glutamate receptor 3, flip isoform	GCTACTGGAA [C/T] CAGTATGAA	S	C	T	N	N
G797u4	WIAF-11850	HT3919	1770	glutamate receptor 3, flip isoform	TCTTTTCCTA [G/A] TCAGCAGGTT	M	G	A	V	I
G797u5	WIAF-13404	HT3919	2711	glutamate receptor 3, flip isoform	GCTACAACGT [G/A] TATGGAACAG	S	G	A	V	V
G797u6	WIAF-13405	HT3919	2376	glutamate receptor 3, flip isoform	CTCAGCATTA [G/A] GAACCCCTGT	M	G	A	G	R
G798u1	WIAF-11868	X77748	2655	GRM3, glutamate receptor, metabotropic 3	TGCAGACGAC [A/G] ACCATGTGCA	S	A	G	T	T

G798u2	WIAF-11879	X77748		GRM3, glutamate receptor, metabotropic 3	2771		CACAGACTGC [A/G] CCTCAACAGG	M	A	G	H	R
G798a3	WIAF-12085	X77748		GRM3, glutamate receptor, metabotropic 3	2699		GTGCTCTGG [G/C] CTGTTTGT	M	G	C	G	A
G798a4	WIAF-12086	X77748		GRM3, glutamate receptor, metabotropic 3	2738		ATCCTGTTTC [A/G] ACCCCAGAAG	M	A	G	Q	R
G798a5	WIAF-12087	X77748		GRM3, glutamate receptor, metabotropic 3	2072		ACACCTTGG [T/C] CAAAGCATCG	M	T	C	V	A
G798a6	WIAF-12088	X77748		GRM3, glutamate receptor, metabotropic 3	2235		CCCTGCTGAC [C/T] AAGACAACT	S	C	T	T	T
G798u7	WIAF-13391	X77748		GRM3, glutamate receptor, metabotropic 3	1131		GGCCAAATGC [C/T] TCCTTCACT	S	C	T	A	A
G799u1	WIAF-11880	M81883		GAD1, glutamate decarboxylase 1 (brain, 67kD)	2000		CAACAAATGC [C/T] TGGAACTGGC	S	C	T	L	L
G799u2	WIAF-11881	M81883		GAD1, glutamate decarboxylase 1 (brain, 67kD)	1822		AGGTATATCT [C/T] CAAGATGCA	S	C	T	L	L
G799u3	WIAF-13392	M81883		GAD1, glutamate decarboxylase 1 (brain, 67kD)	661		GGTGGCCCA [T/C] GGATGCACCA	S	T	C	H	H
G799u4	WIAF-13393	M81883		GAD1, glutamate decarboxylase 1 (brain, 67kD)	556		AGCTGATGGC [G/A] TCTTGGACCC	S	G	A	A	A
G799u5	WIAF-13410	M81883		GAD1, glutamate decarboxylase 1 (brain, 67kD)	1229		CCTCATGGAA [C/T] AAATAACACT	N	C	T	Q	*
G801u1	WIAF-13403	D49394		HTR3, 5-hydroxytryptamine (serotonin) receptor 3	1596		TTTACTGCT [A/G] GCGGTGCTGG	S	A	G	L	L
G803a1	WIAF-13118	U66406		EFNB3, ephrin-B3	1446		CTGGGCTGG [G/A] GGGTGGAGGT	M	G	A	G	E
G804u1	WIAF-11887	Z26653		LAMA2, laminin, alpha 2 (merosin, congenital muscular dystrophy)	7237		TCACTGATGG [G/T] CACATAAAAG	S	G	T	G	G
G804u2	WIAF-11901	Z26653		LAMA2, laminin, alpha 2 (merosin, congenital muscular dystrophy)	9351		GCAAGCACT [G/C] GAGGTTAATT	M	G	C	W	S
G804u3	WIAF-11924	Z26653		LAMA2, laminin, alpha 2 (merosin, congenital muscular dystrophy)	8740		ACACTACCCG [A/G] AGAATTGGTC	S	A	G	R	R

G804u4	WIAP-11943	Z26653		8577	LAMA2, laminin, alpha 2 (merosin, congenital muscular dystrophy)	ACCAAAATCA [A/G] TGATGGCCAG	M	A	G	N	S
G804a5	WIAP-12089	Z26653		3372	LAMA2, laminin, alpha 2 (merosin, congenital muscular dystrophy)	CTCTGTGACT [G/A] CTTCTCCCT	M	G	A	C	Y
G804a6	WIAP-13227	Z26653		7047	LAMA2, laminin, alpha 2 (merosin, congenital muscular dystrophy)	GTCAGTCCCTC [A/G] GGTGGAGAT	M	A	G	Q	R
G804u7	WIAP-13437	Z26653		6791	LAMA2, laminin, alpha 2 (merosin, congenital muscular dystrophy)	TGTGAGAGCC [C/T] TGGATGGACC	S	C	T	L	L
G805u1	WIAP-13416	U14755		799	LHX1, LIM homeobox protein 1	AAGTAAACAGC [A/G] GTGTGCCAA	M	A	G	S	G
G805u2	WIAP-13417	U14755		743	LHX1, LIM homeobox protein 1	GGCGAGGAAC [T/C] CTACATCATC	M	T	C	L	P
G805u3	WIAP-13428	U14755		639	LHX1, LIM homeobox protein 1	GCCGTCAGGG [C/A] ATCTCCCTA	S	C	A	G	G
G806u1	WIAP-11886	AF026547		2656	CSPG3, chondroitin sulfate proteoglycan 3 (neurocan)	TTGGAGTTCC [A/G] GCCATGTCTA	S	A	G	P	P
G806u2	WIAP-11895	AF026547		529	CSPG3, chondroitin sulfate proteoglycan 3 (neurocan)	TGACCTTCGC [T/C] GAGGCCCAGG	S	T	C	A	A
G806u3	WIAP-11896	AF026547		477	CSPG3, chondroitin sulfate proteoglycan 3 (neurocan)	GAGGTGACAG [G/A] TGTGTGTTC	M	G	A	G	D
G806u4	WIAP-11917	AF026547		89	CSPG3, chondroitin sulfate proteoglycan 3 (neurocan)	ACAGGATATC [A/G] CGATGCCAG	M	A	G	T	A
G806u5	WIAP-11918	AF026547		213	CSPG3, chondroitin sulfate proteoglycan 3 (neurocan)	AGCGCAGCCC [G/C] AGATGCCCT	M	G	C	R	P
G806u6	WIAP-11929	AF026547		769	CSPG3, chondroitin sulfate proteoglycan 3 (neurocan)	GCTTTGCCCG [G/A] GAGCTGGGG	S	G	A	R	R
G806u7	WIAP-11931	AF026547		3148	CSPG3, chondroitin sulfate proteoglycan 3 (neurocan)	ACATTGATGA [C/T] TGCCTCTGCA	S	C	T	D	D

G806u8	WIAP-11949	AF026547	CSPG3, chondroitin sulfate proteoglycan 3 (neurocan)	209	GCACAGCGCA [G/A] CCGAGATGC	M	G	A	A	T
G806a9	WIAP-13114	AF026547	CSPG3, chondroitin sulfate proteoglycan 3 (neurocan)	3430	ATGAAAACAC [G/A] TGGATCGGC	S	G	A	T	T
G806u10	WIAP-13420	AF026547	CSPG3, chondroitin sulfate proteoglycan 3 (neurocan)	2113	CCAGGGCAGA [C/G] TTCAGAGAA	M	C	G	D	E
G806u11	WIAP-13431	AF026547	CSPG3, chondroitin sulfate proteoglycan 3 (neurocan)	94	ATATCACCGA [T/G] GCCAGCGAA	M	T	G	D	E
G806u12	WIAP-13432	AF026547	CSPG3, chondroitin sulfate proteoglycan 3 (neurocan)	275	ACAGGACTTG [C/T] CCATCCTGGT	M	C	T	P	S
G808a1	WIAP-13117	Y13276	TLX, tailless homolog	177 (Drosophila)	GCATGAGCAA [G/A] CCAGCCGGAT	S	G	a	K	K
G810u1	WIAP-11890	X98248	990 SORT1, sortilin 1	990	ATAAGGATAC [C/A] ACAAGAAGGA	S	C	A	T	T
G810u2	WIAP-11891	X98248	1093 SORT1, sortilin 1	1093	GGCAGCAAA [G/T] ATGACATGGT	M	G	T	D	Y
G810u3	WIAP-11907	X98248	1683 SORT1, sortilin 1	1683	CACAGGAGG [T/G] CATGCTGGC	S	T	G	G	G
G810u4	WIAP-11908	X98248	1433 SORT1, sortilin 1	1433	ATCTCCAGA [A/C] ACTGAATGTT	M	A	C	K	T
G810u5	WIAP-11909	X98248	1354 SORT1, sortilin 1	1354	GAAGCCTGAA [A/G] ACAGTGAATG	M	A	G	N	D
G810u6	WIAP-11910	X98248	2180 SORT1, sortilin 1	2180	TACCGGAAA [T/A] TCCAGGGGAC	M	T	A	I	N
G810u7	WIAP-11911	X98248	2264 SORT1, sortilin 1	2264	AACTTTTGA [G/A] TCCGGAAAA	M	G	A	S	N
G810u8	WIAP-11925	X98248	1993 SORT1, sortilin 1	1993	TCGAGACTAT [G/A] TTGTGACCAA	M	G	A	V	I
G810u9	WIAP-11939	X98248	1351 SORT1, sortilin 1	1351	GAGGAGCCT [G/C] AAACACATGA	M	G	C	E	Q
G810u10	WIAP-11940	X98248	2232 SORT1, sortilin 1	2232	AAGTAAAGA [C/T] TTGAAAAAGA	S	C	T	D	D
G810a11	WIAP-13115	X98248	1769 SORT1, sortilin 1	1769	TCCATGAATA [T/A] CAGCATTTGG	M	T	A	I	N
G810a12	WIAP-13116	X98248	1757 SORT1, sortilin 1	1757	CCTGGAGCTA [G/A] GTCCATGAAT	M	G	A	R	K
G811u1	WIAP-11893	HT3676	900 synapsin I, alt. transcript 1	900	TGACCAAGAC [G/A] TATGCCACTG	S	G	A	T	T
G811u2	WIAP-11894	HT3676	758 synapsin I, alt. transcript 1	758	ACCTTCTACC [C/T] CAATCAAAA	M	C	T	P	L
G811u3	WIAP-11927	HT3676	996 synapsin I, alt. transcript 1	996	CGTCAGTGTG [A/T] GGGAACTGGA	S	A	T	S	S
G811u4	WIAP-11928	HT3676	1054 synapsin I, alt. transcript 1	1054	CATGCTCTGAC [A/G] ATACCAAGCT	M	A	G	R	G
G811u5	WIAP-13418	HT3676	249 synapsin I, alt. transcript 1	249	TGTCCAAGGC [G/A] GTCACGAGA	S	G	A	A	A

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G811u6	WIAF-113419	HT3676	432	synapsin I, alt. transcript 1	TTAAAGTAGA [G/A] CAGGCCGAAT	S	G	A	E	E
G812u1	WIAF-11898	HT4564	163	STX1A, syntaxin 1A (brain)	CCAACCCCGA [T/C] GAGAAGACGA	S	T	C	D	D
G812u2	WIAF-11942	HT4564	604	STX1A, syntaxin 1A (brain)	TACAGACAT [G/T] TTCTATGACA	M	G	T	M	I
G813u1	WIAF-11934	U72508	939	Human B7 mRNA, complete cds.	TATGACACAG [G/A] ACAGAGGATG	M	G	A	G	E
G813u2	WIAF-11948	U72508	619	Human B7 mRNA, complete cds.	GCATCCACAT [G/C] GTGACAGGTC	M	G	C	M	I
G816u1	WIAF-11897	HT4230	151	HTR2B, 5-hydroxytryptamine (serotonin) receptor 2B	CTAACTGGTC [T/G] GGATTACAGA	S	T	G	S	S
G816u2	WIAF-11930	HT4230	189	HTR2B, 5-hydroxytryptamine (serotonin) receptor 2B	GAAATGAAC [A/G] GATTGTTGAG	M	A	G	Q	R
G818u1	WIAF-11902	HT2694	753	TPH, tryptophan hydroxylase (tryptophan 5-monoxygenase)	GAGTTTTC [C/T] TGCACCTCAAT	S	C	T	H	H
G818u2	WIAF-11903	HT2694	775	TPH, tryptophan hydroxylase (tryptophan 5-monoxygenase)	TGTGACACAC [A/G] GTTCAGATCC	M	A	G	S	G
G818u3	WIAF-11904	HT2694	1211	TPH, tryptophan hydroxylase (tryptophan 5-monoxygenase)	TATAATCCAT [A/C] TACACGGAGT	M	A	C	Y	S
G818u4	WIAF-11905	HT2694	1081	TPH, tryptophan hydroxylase (tryptophan 5-monoxygenase)	GATTACCTGC [A/C] AACAGGAATG	M	A	C	K	Q
G818u5	WIAF-11933	HT2694	795	TPH, tryptophan hydroxylase (tryptophan 5-monoxygenase)	CCCTCTATAC [C/T] CCAGAGCCAG	S	C	T	T	T
G818u6	WIAF-11935	HT2694	1239	TPH, tryptophan hydroxylase (tryptophan 5-monoxygenase)	TCCTGAAAGA [C/T] ACCAAGAGCA	S	C	T	D	D
G822u1	WIAF-11906	HT0207	936	ASMT, acetylserotonin N-methyltransferase	CACACGAAA [G/T] TGCTCACACC	M	G	T	K	N
G822u2	WIAF-11919	HT0207	637	ASMT, acetylserotonin N-methyltransferase	TGCTGGACA [C/T] GGATAAGCT	M	C	T	R	W

G822u3	WIAF-11936	HT0207	ASMT, acetylserotonin N-methyltransferase	318	ASMT, acetylserotonin N-methyltransferase	GAAAAGCTTT[C/T]TATCGAACA	S	C	T	F	F
G822u4	WIAF-11937	HT0207	ASMT, acetylserotonin N-methyltransferase	116	ASMT, acetylserotonin N-methyltransferase	AATGACTACG[C/T]CAACGGCTTC	M	C	T	A	V
G822u5	WIAF-11938	HT0207	ASMT, acetylserotonin N-methyltransferase	930	ASMT, acetylserotonin N-methyltransferase	ACTGGGCAGA[C/T]GGAAGTGCT	S	C	T	D	D
G822u6	WIAF-13427	HT0207	ASMT, acetylserotonin N-methyltransferase	120	ASMT, acetylserotonin N-methyltransferase	ACTAGGCCAA[C/A]GGCTTCATGG	M	C	A	N	K
G825u1	WIAF-11888	HT4974	ADAR, adenosine deaminase, RNA-specific	236	ADAR, adenosine deaminase, RNA-specific	GCTCAGATAC[C/T]AGCAGCCTGG	N	C	T	Q	*
G825u2	WIAF-11900	HT4974	ADAR, adenosine deaminase, RNA-specific	3076	ADAR, adenosine deaminase, RNA-specific	TCTTTGACAA[A/G]TCCTGACGG	S	A	G	K	K
G825u3	WIAF-11912	HT4974	ADAR, adenosine deaminase, RNA-specific	2537	ADAR, adenosine deaminase, RNA-specific	CTTGATTGGG[C/G]AGAACGAGAA	M	G	C	E	Q
G825u4	WIAF-11941	HT4974	ADAR, adenosine deaminase, RNA-specific	3558	ADAR, adenosine deaminase, RNA-specific	GATGGCTATG[A/G]CCTGGAGATC	M	A	G	D	G
G825a5	WIAF-12090	HT4974	ADAR, adenosine deaminase, RNA-specific	1305	ADAR, adenosine deaminase, RNA-specific	CCTGAGACCA[A/G]AAGAACGCA	M	A	G	K	R
G825u6	WIAF-13426	HT4974	ADAR, adenosine deaminase, RNA-specific	3683	ADAR, adenosine deaminase, RNA-specific	CCGCAGGGAT[C/T]TACTGAGACT	S	C	T	L	L
G826u1	WIAF-12554	X99383	ADARB1, adenosine deaminase, RNA-specific, B1 (homolog of rat RED1)	2109	ADARB1, adenosine deaminase, RNA-specific, B1 (homolog of rat RED1)	AGATTACCAA[A/G]CCCAACGTGT	S	A	G	K	K
G826u2	WIAF-12566	X99383	ADARB1, adenosine deaminase, RNA-specific, B1 (homolog of rat RED1)	1698	ADARB1, adenosine deaminase, RNA-specific, B1 (homolog of rat RED1)	TGTCCTGCAG[T/G]GACAGATTG	M	T	G	S	R
G829u1	WIAF-13735	U49262	DVL3, dishevelled 3 (homologous to Drosophila dsh)	1404	DVL3, dishevelled 3 (homologous to Drosophila dsh)	GGGTGGAGG[T/C]CCGTGACTGC	M	T	C	V	A
G83u1	WIAF-10449	HT1576	DNMT1, DNA (cytosine-5-) methyltransferase 1	1338	DNMT1, DNA (cytosine-5-) methyltransferase 1	ATGATGACCC[C/G/A]TCTCTTGAAG	S	G	A	P	P
G83u2	WIAF-10450	HT1576	DNMT1, DNA (cytosine-5-) methyltransferase 1	1871	DNMT1, DNA (cytosine-5-) methyltransferase 1	AAGCTGGTCT[A/G]CCAGATCTTC	M	A	G	Y	C
G83u3	WIAF-10468	HT1576	DNMT1, DNA (cytosine-5-) methyltransferase 1	928	DNMT1, DNA (cytosine-5-) methyltransferase 1	AAATCCACAG[A/G]TTTCTGATGA	M	A	G	I	V
G83u4	WIAF-10469	HT1576	DNMT1, DNA (cytosine-5-) methyltransferase 1	1562	DNMT1, DNA (cytosine-5-) methyltransferase 1	AATTCCGACT[C/T]GACCTATGAG	M	C	T	S	L
G83u5	WIAF-10471	HT1576	DNMT1, DNA (cytosine-5-) methyltransferase 1	2424	DNMT1, DNA (cytosine-5-) methyltransferase 1	GGGCACGTC[C/G/A]GACCCCTCTGG	S	G	A	S	S

G83u6	WIAF-10473	HT1576	3790	DNMT1, DNA (cytosine-5)- methyltransferase 1	GTTCTTCTC [C/T] TGGAGAATGT	S	C	T	L	L
G83u7	WIAF-10486	HT1576	1581	DNMT1, DNA (cytosine-5)- methyltransferase 1	AGGACCTGAT [C/A] AACAGATCG	S	C	A	I	I
G832u1	WIAF-12577	U13387	1129	PAFAH1B1, platelet-activating factor acetylhydrolase, isoform 1b, alpha subunit (45KD)	AGACATTTCAC [A/T] GGCACACAGAG	S	A	T	T	T
G835u1	WIAF-12555	U38276	1311	SEMA3F, sema domain, immunoglobulin domain (Ig), short basic domain, secreted, 3F	CCTCTGGCTC [C/A] GTGTTCGAG	S	C	A	S	S
G835u2	WIAF-12556	U38276	1229	SEMA3F, sema domain, immunoglobulin domain (Ig), short basic domain, secreted, 3F	ACTCATTCTG [A/T] TGAGCTCCAG	M	A	T	D	V
G835u3	WIAF-12557	U38276	1473	SEMA3F, sema domain, immunoglobulin domain (Ig), short basic domain, secreted, 3F	GAACCTTCAC [G/A] CCATCTATGA	S	G	A	T	T
G835a4	WIAF-13138	U38276	1726	SEMA3F, sema domain, immunoglobulin domain (Ig), short basic domain, secreted, 3F	TGACCAGGAG [A/T] TGGAGGAGCT	M	A	T	M	L
G836u1	WIAF-12592	U28369	1056	SEMA3B, sema domain, immunoglobulin domain (Ig), short basic domain, secreted, 3B	AACGACGTGG [G/A] CGGCCACGGC	M	G	A	G	D
G836u2	WIAF-12609	U28369	1479	SEMA3B, sema domain, immunoglobulin domain (Ig), short basic domain, secreted, 3B	GTCTTGCCCA [C/T] TGGGGGGCGC	M	C	T	T	I
G838u1	WIAF-12590	U72671	1107	ICAM5, intercellular adhesion molecule 5, telencephalin	CGCAGCTGGG [A/G] CCCAAGCTCT	M	A	G	T	A
G838u2	WIAF-12591	U72671	966	ICAM5, intercellular adhesion molecule 5, telencephalin	CAGGCAGCTG [A/G] TCTGCAACGT	M	A	G	I	V



G840a1	WIAP-12109	HT961	2232	SOS1, son of sevenless (Drosophila) homolog 1	CTCAGGCARA [T/C] GGAGTAAGCC	S	T	C	N	N
G840a2	WIAP-12110	HT961	2404	SOS1, son of sevenless (Drosophila) homolog 1	ACCGTCTGAA [C/G] TTGTAGGAG	M	C	G	L	V
G840u3	WIAP-12213	HT961	3813	SOS1, son of sevenless (Drosophila) homolog 1	CAAGGTACC [G/A] COTCATGCT	S	G	A	P	P
G841u1	WIAP-12153	HT97420	1372	SMOH, smoothened (Drosophila) homolog	TTTTGGCTTC [C/G] TGGCCTTGG	M	C	G	L	V
G841u2	WIAP-12179	HT97420	858	SMOH, smoothened (Drosophila) homolog	CCCAGTTCAT [G/T] GATGGTGCC	M	G	T	M	I
G841u3	WIAP-12185	HT97420	1164	SMOH, smoothened (Drosophila) homolog	CTGTGAGTGG [C/G] ATTGTTTGG	S	C	G	G	G
G847u1	WIAP-12588	L41939	2019	EPHB2, Epha2	GGTCTGCAGT [G/T] GCCACCTGAA	M	G	T	G	C
G847u2	WIAP-12596	L41939	1806	EPHB2, Epha2	GTGTAACAGA [A/C] GACGGGGTT	S	A	C	R	R
G847u3	WIAP-12613	L41939	2885	EPHB2, Epha2	AGGCATCAA [G/C] ATGGGGCAGT	M	G	C	K	N
G848u1	WIAP-12685	L40636	2484	EPHB1, Epha1	GTCAACAGTA [A/G] CCTGGTGTGC	M	A	G	N	S
G848u2	WIAP-12690	L40636	2020	EPHB1, Epha1	CCTTCACTTA [T/C] GAGGATCCCA	S	T	C	Y	Y
G849u1	WIAP-11920	D83492	1544	EPHB6, Epha6	ACCTGTGGG [C/T] TCATGCAGAG	M	C	T	A	V
G849u2	WIAP-11921	D83492	3301	EPHB6, Epha6	CTTTGGGATA [C/T] TCATGTGGGA	M	C	T	L	F
G849u3	WIAP-13412	D83492	1139	EPHB6, Epha6	GAGACCTTCA [C/T] CCTTACTAC	M	C	T	T	I
G849u4	WIAP-13413	D83492	1895	EPHB6, Epha6	TTTGAGGTGC [A/C] AGGCTCAGCA	M	A	C	Q	P
G849u5	WIAP-13414	D83492	2338	EPHB6, Epha6	CTATGACCAG [G/A] CAGAAGACGA	M	G	A	A	T
G849u6	WIAP-13415	D83492	2567	EPHB6, Epha6	GGGCTTTGG [C/G] CTTCTCTCTG	M	C	G	A	G
G849u7	WIAP-13422	D83492	2860	EPHB6, Epha6	GGCCATCCAG [G/A] CCCTGTGGGC	M	G	A	A	T
G849u8	WIAP-13423	D83492	2782	EPHB6, Epha6	GGAGGTCAAT [G/C] GGAACAGCTC	M	G	C	G	R
G849u9	WIAP-13424	D83492	3038	EPHB6, Epha6	TTCTCAGGC [A/G] GCGGGAGGGC	M	A	G	Q	R
G849u10	WIAP-13425	D83492	3637	EPHB6, Epha6	AGCCATTGGA [C/T] TGGAGTGCTA	S	C	T	L	L
G856u1	WIAP-12625	D45906	1323	LIMK2, LIM domain kinase 2	AGCTGACCT [G/C] CTGACAGAT	S	G	C	L	L
G858u1	WIAP-12630	U65019	864	MADH2, MAD (mothers against decapentaplegic, Drosophila) homolog 2	TTTGGTGTTC [G/A] ATAGCATATT	S	G	A	S	S
G86u1	WIAP-10437	HT1701	263	RAD51, RAD51 (S. cerevisiae) homolog (E. coli RecA homolog)	TGACCAAT [G/C] CAGATACTTC	M	G	C	A	P
G86u2	WIAP-10465	HT1701	861	RAD51, RAD51 (S. cerevisiae) homolog (E. coli RecA homolog)	GCATCAGCCA [T/C] GATGCTAGAA	M	T	C	M	T

G86u3	WIAP-10466	HT1701		RAD51, RAD51 ( <i>S. cerevisiae</i> ) homolog (E coli RecA homolog)	924	TACAGAACAG [A/G] CTACTCGGT	M	A	G	D	G
G864a1	WIAP-13139	X82324		POU3F4, POU domain, class 3, transcription factor 4	183	CAGCAATGGG [C/T] ATCCCTCGG	M	C	T	H	Y
G866u1	WIAP-12637	HT0101		glutamate receptor (GB:M64752)	2576	AAATCCCGTA [G/A] TGAATCCAAAG	M	G	A	S	N
G866u2	WIAP-12638	HT0101		glutamate receptor (GB:M64752)	1131	TAACAGGAAA [C/T] GTGCAGTTTA	S	C	T	N	N
G869u1	WIAP-13406	HT33620		GRIN2C, glutamate receptor, ionotropic, N-methyl D-aspartate 2C	3627	AGATCAGCAG [G/T] GTAGCCCGTG	M	G	T	R	S
G870u1	WIAP-11889	HT4468		SLC1A1, solute carrier family 1 (neuronal/epithelial high affinity glutamate transporter, system Xag), member 1	714	CAGAAGAGTC [C/G] TTCACAGCTG	S	C	G	S	S
G870u2	WIAP-11913	HT4468		SLC1A1, solute carrier family 1 (neuronal/epithelial high affinity glutamate transporter, system Xag), member 1	314	CTAGAGAAAT [T/A] CTACTTTGCT	M	T	A	F	Y
G870u3	WIAP-11914	HT4468		SLC1A1, solute carrier family 1 (neuronal/epithelial high affinity glutamate transporter, system Xag), member 1	579	AAGTCAGTAC [G/A] GTGGATGCCA	S	G	A	T	T
G870u4	WIAP-11922	HT4468		SLC1A1, solute carrier family 1 (neuronal/epithelial high affinity glutamate transporter, system Xag), member 1	706	GAACATGACA [G/A] AAGAGTCCTT	M	G	A	E	K

G870u5	WIAF-11923	HT4468			SLC1A1, solute carrier family 1 (neuronal/epithelial high affinity glutamate transporter, system Xag), member 1	978		GGAAGATCAT [A/G] GAAGTTCAAG	M	A	G	I	M
G871u1	WIAF-11892	HT3187			SLC1A3, solute carrier family 1 (glial high affinity glutamate transporter), member 3	1004		TTCTCTTAAC [G/C] AAGCCATCAT	M	G	C	E	Q
G871u2	WIAF-11915	HT3187			SLC1A3, solute carrier family 1 (glial high affinity glutamate transporter), member 3	1154		TGTTGGCTTA [C/T] TCATTCAAGC	M	C	T	L	F
G871u3	WIAF-11926	HT3187			SLC1A3, solute carrier family 1 (glial high affinity glutamate transporter), member 3	1412		GGCTGCCATT [T/G] TCATTGCTCA	M	T	G	F	V
G871u4	WIAF-11944	HT3187			SLC1A3, solute carrier family 1 (glial high affinity glutamate transporter), member 3	1217		AAACCTTGG [G/A] TTTTATTGG	M	G	A	V	I
G872u1	WIAF-13433	HT4077			SLC1A2, solute carrier family 1 (glial high affinity glutamate transporter), member 2	1271		CTGTTGGAGC [A/C] ACCATTAAACA	S	A	C	A	A
G879u1	WIAF-11899	HT28317			GRM2, glutamate receptor, metabotropic 2	1273		GACTTGTGTC [T/C] CAAGTCAAG	M	T	C	L	P
G879u2	WIAF-11932	HT28317			GRM2, glutamate receptor, metabotropic 2	2349		CTTCTATGTC [A/G] CCTCCAGTGA	M	A	G	T	A
G879u3	WIAF-13421	HT28317			GRM2, glutamate receptor, metabotropic 2	2186		ATGCAAGTAT [G/T] TTGGGCTGCG	M	G	T	M	I
G879u4	WIAF-13429	HT28317			GRM2, glutamate receptor, metabotropic 2	2567		CCCAGTTTGT [C/T] CCCACTGTTT	S	C	T	V	V
G879u5	WIAF-13436	HT28317			GRM2, glutamate receptor, metabotropic 2	2046		ACAGGTGGCC [A/G] TCTGCGCTGGC	M	A	G	I	V
G879u6	WIAF-13438	HT28317			GRM2, glutamate receptor, metabotropic 2	2425		GTGCTTGGCT [G/T] CCTCTTTGGG	M	G	T	C	F

G879u7	WIAF-13439	HT28317	GRM2, glutamate receptor, metabotropic 2	2463	CCTCTTCCAG [C/T] CGCAGAAGAA	M	C	T	P	S
G880u1	WIAF-12164	HT33719	GRM4, glutamate receptor, metabotropic 4	2117	AGCCGACCT [T/G] GGCACCTGCT	S	T	G	L	L
G880u2	WIAF-12176	HT33719	GRM4, glutamate receptor, metabotropic 4	2427	GGACCTGCG [C/T] TCATCTGCGT	M	C	T	L	F
G880u3	WIAF-12192	HT33719	GRM4, glutamate receptor, metabotropic 4	2372	ACCAGCGGAC [A/G] CTCGACCCCC	S	A	G	T	T
G883a1	WIAF-13140	HT48863	GRM7, glutamate receptor, metabotropic 7	1408	ATCGCAAAATG [C/a] ACAGGACAGG	N	C	a	C	*
G883a2	WIAF-13141	HT48863	GRM7, glutamate receptor, metabotropic 7	2027	TCCGTGCTTC [C/t] TGGCAATGTT	S	C	t	L	L
G883a3	WIAF-13147	HT48863	GRM7, glutamate receptor, metabotropic 7	1813	TGTGCACACT [A/g] CCATGTAAAGC	S	A	g	L	L
G883a4	WIAF-13148	HT48863	GRM7, glutamate receptor, metabotropic 7	1536	TGTGCTGACT [A/t] CCGGGGTGTC	M	A	t	Y	F
G883a5	WIAF-13149	HT48863	GRM7, glutamate receptor, metabotropic 7	2473	AAGCCAGAGG [G/a] GTTCTCAAGT	S	G	a	G	G
G883a6	WIAF-13150	HT48863	GRM7, glutamate receptor, metabotropic 7	2434	TCATAGACTA [C/t] GATGAACACA	S	C	t	Y	Y
G884u1	WIAF-11916	U95025	GRM8, glutamate receptor, metabotropic 8	1052	CGAACTCTTG [C/A] CAATAATCGA	M	C	A	A	D
G884u2	WIAF-11945	U95025	GRM8, glutamate receptor, metabotropic 8	2016	AAACNAACCG [T/C] ATCCACCGAA	S	T	C	R	R
G884u3	WIAF-11946	U95025	GRM8, glutamate receptor, metabotropic 8	1852	GAGGCTTCA [G/A] GACCGCAACT	M	G	A	G	R
G884u4	WIAF-11947	U95025	GRM8, glutamate receptor, metabotropic 8	2078	ATTAGTCCAG [C/G] ATCTCAGCTG	M	C	G	A	G
G884u5	WIAF-13430	U95025	GRM8, glutamate receptor, metabotropic 8	1897	TTTTCTCTGT [T/G] ATTCAATCAC	M	T	G	Y	D
G884u6	WIAF-13435	U95025	GRM8, glutamate receptor, metabotropic 8	2364	TTACCATGTA [T/C] ACCACCTGCA	S	T	C	Y	Y
G885u1	WIAF-13434	AF002700	GFR2, GDNF family receptor alpha	1363	AACTCAGGCC [C/A] CAGCAGAGCC	M	C	A	P	H
G886a1	WIAF-13142	U95847	GFR1, GDNF family receptor alpha	497	GAAGTCGCTC [T/a] ACAACTGCCG	M	T	a	Y	N
G886a2	WIAF-13143	U95847	GFR1, GDNF family receptor alpha	1385	GTCTGAGAAAT [G/a] AAATTCCTCCAC	M	G	a	E	K

G886a3	WIAF-11151	U95847	781	GFR1, GDNF family receptor alpha	GCGTGTCCAA [T/C] GATGTCGTGCA	S	T	C	N	N
G892u1	WIAF-111956	U12140	798	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	TGGCAATCC [A/G] TTTACATGCT	S	A	G	P	P
G892u2	WIAF-111957	U12140	834	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	GGATCAAGAC [T/A] CTCCTAAGAGG	S	T	A	T	T
G892u3	WIAF-111958	U12140	956	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	GCAATCTGG [C/T] GGCACCTAAC	M	C	T	A	V
G892u4	WIAF-111960	U12140	1738	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	CTCCAAGTTT [G/A] GCATGAAGG	M	G	A	G	S
G892u5	WIAF-111962	U12140	2486	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	GTCGGTGGCC [A/G] CACAATGCTG	M	A	G	H	R
G892u6	WIAF-111965	U12140	1106	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	TCCTTAAGGA [T/C] AACTAACATT	M	T	C	I	T
G892u7	WIAF-111966	U12140	2085	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	AGGATGCCAG [T/C] GACAATGCAC	S	T	C	S	S
G892u8	WIAF-111967	U12140	2230	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	GGACCTCAAC [A/C] AGTTCCTCAG	M	A	C	K	Q
G892u9	WIAF-111968	U12140	2223	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	AGCATGGGA [C/T] CTCACACAAGT	S	C	T	D	D
G892u10	WIAF-111992	U12140	1602	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	GTAATGAAT [C/T] CCTTCCACAG	S	C	T	I	I
G892u11	WIAF-111998	U12140	1354	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	TACTAAAATA [C/T] ATGTTACCAA	M	C	T	H	Y
G892u12	WIAF-111999	U12140	1944	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	CATTGTGTCA [G/C] CACATCAAGC	M	G	C	O	H

G892u13	WIAF-12000	U12140	2103	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	CACGCAAGGA [C/T] TTCCACCGTG	S	C	T	D	D
G892u14	WIAF-12001	U12140	1860	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	CTGTCATTAT [T/C] GGAATGACCA	S	T	C	I	I
G892a15	WIAF-13144	U12140	1868	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	ATTGGAATGA [C/G] CAAGATCCCT	M	C	G	T	S
G892a16	WIAF-13145	U12140	1903	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	CCAGTACTTT [G/T] GCATCACCAA	M	G	T	G	C
G892a17	WIAF-13146	U12140	1965	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	GACATAACAT [T/G] GTTCTGAAAA	M	T	G	I	M
G892u18	WIAF-13442	U12140	958	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	AAATCTGGCC [G/T] CACCTAACCT	M	G	T	A	S
G892u19	WIAF-13446	U12140	2502	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	TGCTGCCCAT [T/C] CGCTGGATGC	S	T	C	I	I
G892u20	WIAF-13447	U12140	2317	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	GATGCTGCAT [A/T] TAGCCCCAGCA	M	A	T	I	L
G892u21	WIAF-13448	U12140	2364	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	CGTCCCAGCA [C/A] TTCTGTGCACC	M	C	A	H	Q
G892u22	WIAF-13449	U12140	2507	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	CCCATTCGCT [G/A] GATGCTCCCA	N	G	A	W	*
G892u23	WIAF-13471	U12140	2389	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	TTTGGCCACC [A/C] GGAATGCGCT	S	A	C	R	R
G892u24	WIAF-13472	U12140	2416	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	GGAGAACTTG [C/T] TGGTGAAAT	S	C	T	L	L
G892u25	WIAF-13474	U12140	359	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	GGGATGTGCT [C/T] CTGGATAAGG	M	C	T	S	P

G892u26	WIAP-13479	U12140		1044	NTRK2, neurotrophic tyrosine kinase, receptor, type 2	TGTATTGGGA [T/C] GTTGTTAACC	S	T	C	D	D
G9u1	WIAP-10222	J03826		1130	FDXR, ferredoxin reductase	GGTATAAGAG [C/T] CGCCCTGTGG	S	C	T	S	S
G9u2	WIAP-10258	J03826		308	FDXR, ferredoxin reductase	CCGGAGCTGC [A/G] GGAGGCTTAC	M	A	G	Q	R
G900u1	WIAP-11970	HT3470		497	STX4A, syntaxin 4A (placental)	TGCAATTCAA [T/C] GCAGTCCGAA	M	T	C	M	T
G901u1	WIAP-11969	HT27792		758	STX3A, syntaxin 3A	TGCACACAGT [G/A] GACCCCTGG	S	G	A	V	V
G901u2	WIAP-11971	HT27792		317	STX3A, syntaxin 3A	ACGTCCGGAA [C/A] AACTGAGGA	M	C	A	N	K
G901u3	WIAP-12002	HT27792		611	STX3A, syntaxin 3A	AGCAAGCCCT [C/T] AGTGAGATTG	S	C	T	L	L
G901u4	WIAP-12003	HT27792		909	STX3A, syntaxin 3A	GCTGAATTAA [G/A] AGTGGCCCTAA	-	G	A	-	-
G901u5	WIAP-12004	HT27792		163	STX3A, syntaxin 3A	ATTGAGGAAA [C/T] TCGGCTTAAC	M	C	T	T	I
G901a6	WIAP-13152	HT27792		82	STX3A, syntaxin 3A	CAGCTGACAC [A/G] GGATGATGAT	M	A	G	Q	R
G901u7	WIAP-13453	HT27792		828	STX3A, syntaxin 3A	CCGGAAGAAA [T/C] TGTATAATTAT	S	T	C	L	L
G901u8	WIAP-13455	HT27792		226	STX3A, syntaxin 3A	TACAGTATCA [T/C] TCTCTCTGCA	M	T	C	I	T
G902u1	WIAP-13454	HT27744		848	STX5A, syntaxin 5A	ACTTCCAGTC [T/A] GTCACCTCCA	S	T	A	S	S
G902u2	WIAP-13456	HT27744		338	STX5A, syntaxin 5A	ATTTCGTGAG [A/G] GCCAAGGGCA	S	A	G	R	R
G905u1	WIAP-12202	HT27789		487	CREBL1, cAMP responsive element binding protein-like 1	TCCAGATCAA [C/T] GTTATCCCA	S	C	T	N	N
G905u2	WIAP-12219	HT27789		151	CREBL1, cAMP responsive element binding protein-like 1	ATTCTGGCCT [A/T] GATGAAGTGG	S	A	T	L	L
G905u3	WIAP-12230	HT27789		649	CREBL1, cAMP responsive element binding protein-like 1	AGTCCCTGTC [C/G] CCTTCAGGAT	S	C	G	S	S
G906u1	WIAP-12214	HT4372		2127	N-ethylmaleimide-sensitive factor	AAGGAAGAA [G/A] GTCTGGATAG	S	G	A	K	K
G906u2	WIAP-12221	HT4372		514	N-ethylmaleimide-sensitive factor	GGGAGAGCCT [G/A] CGACAGGGAA	M	G	A	A	T
G908u1	WIAP-12201	HT3665		98	RAB5A, member RAS oncogene family	GCCCAATATAC [T/G] GGAATAAATA	S	T	G	T	T

G91u1	WIAF-10438	HT1848		496	ERCC1, excision repair cross-complementing rodent repair deficiency, complementation group 1 (includes overlapping antisense sequence)	TCGTGCGCAA [C/T] TGCCCTGGG	S	C	T	N	N
G91u2	WIAF-10439	HT1848		367	ERCC1, excision repair cross-complementing rodent repair deficiency, complementation group 1 (includes overlapping antisense sequence)	CTGGGGCCAC [G/A] TGCCCCACAG	S	G	A	T	T
G91a1	WIAF-13210	HT3672		252	synaptobrevin 1	GCAGTGCTGC [C/A] AAGCTAAAGA	S	C	A	A	A
G915a1	WIAF-12115	D63506		1390	Homo sapiens mRNA for unc-18homologue, complete cds.	TTACCTTGGT [G/A] TTCCCAATGT	M	G	A	V	I
G915u2	WIAF-12293	D63506		685	Homo sapiens mRNA for unc-18homologue, complete cds.	ACAGCTTGT [G/A] AAAAAAAGCT	M	G	A	E	K
G916a1	WIAF-13209	HT28523		308	Huntingtin associated protein 1-like protein	GAGCAGTTT [C/T] GGAGGCCAGC	M	C	T	S	L
G916a2	WIAF-13211	HT28523		762	Huntingtin associated protein 1-like protein	CGAGGAGGTT [G/C] GTGCCCCAGG	M	G	C	L	F
G916a3	WIAF-13212	HT28523		560	Huntingtin associated protein 1-like protein	GAGCTCAGAA [C/T] GTCTCTAAGG	M	C	T	T	M
G917u1	WIAF-11972	U79734		1075	HIP1, huntingtin interacting protein 1	AGAGCCAGCG [G/A] GTTGTGCTGC	S	G	A	R	R
G917u2	WIAF-11973	U79734		1005	HIP1, huntingtin interacting protein 1	GACCACCTTA [T/C] TGAGCGACTA	M	T	C	I	T
G917u3	WIAF-11977	U79734		1539	HIP1, huntingtin interacting protein 1	CTGCAAGGCA [G/A] CCTGGAAACT	M	G	A	S	N
G917u4	WIAF-12005	U79734		817	HIP1, huntingtin interacting protein 1	TGGTGGTGAT [C/T] CCTGCAGAGG	S	C	T	I	I
G917u5	WIAF-12006	U79734		1906	HIP1, huntingtin interacting protein 1	GCTGGAGCCA [G/C] TATCTGSCCT	M	G	C	Q	H
G917a6	WIAF-13157	U79734		993	HIP1, huntingtin interacting protein 1	AAGATGAGA [A/G] GGACCACTTA	M	A	G	K	R
G919u1	WIAF-11974	D30742		707	CAMK4, calcium/calmodulin-dependent protein kinase IV	ACTCGGCACC [T/C] GAATTTCTTA	S	T	C	P	P



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G919u2	WIAF-11991	D30742	1139	CAMK4, calcium/calmodulin-dependent protein kinase IV	AGACCCACAA [G/A] GCTAGCCGAG	S	G	A	K	K
G919u3	WIAF-12007	D30742	834	CAMK4, calcium/calmodulin-dependent protein kinase IV	CATGTTCCAGG [A/T] GAATTCGAA	N	A	T	R	*
G919u4	WIAF-13443	D30742	1088	CAMK4, calcium/calmodulin-dependent protein kinase IV	TGGCCTCTTC [C/G] CGCCTGGAA	S	C	G	S	S
G920u1	WIAF-11979	X78520	1952	CLCN3, chloride channel 3	ATGACATTCCT [T/C] GATCGTCCAG	S	T	C	P	P
G920u2	WIAF-11980	X78520	1819	CLCN3, chloride channel 3	ATAGCCTTCC [C/T] TAATCCATAC	M	C	T	P	L
G920u3	WIAF-11981	X78520	2094	CLCN3, chloride channel 3	CATTGGAGCG [A/G] TCGCAGGAAG	M	A	G	I	V
G920u4	WIAF-11983	X78520	2822	CLCN3, chloride channel 3	ATATTTTCCG [A/G] AAGCTGGAC	S	A	G	R	R
G920u5	WIAF-11984	X78520	2745	CLCN3, chloride channel 3	GCCATTGAAG [C/T] TTCGAACAT	M	C	T	L	F
G920u6	WIAF-11987	X78520	2499	CLCN3, chloride channel 3	TCCCTTAGCT [G/T] TCCTGACACA	M	G	T	V	F
G920u7	WIAF-12008	X78520	1251	CLCN3, chloride channel 3	CATCATCAGA [G/A] GTTACTTGGG	M	G	A	G	S
G920u8	WIAF-12011	X78520	888	CLCN3, chloride channel 3	AGTAGTAACA [C/T] TAACAGGATT	S	C	T	L	L
G920u9	WIAF-13459	X78520	2804	CLCN3, chloride channel 3	CAATGGAGAT [T/C] GTGGTGGATA	S	T	C	I	I
G921u1	WIAF-11954	J02908	931	CLU, clusterin (complement lysis inhibitor, SP-40,40, sulfated glycoprotein 2, testosterone-repressed prostate message 2, apolipoprotein J)	GAGAGTTTGA [C/T] CAGGAATATC	M	C	T	T	I
G921u2	WIAF-11955	J02908	880	CLU, clusterin (complement lysis inhibitor, SP-40,40, sulfated glycoprotein 2, testosterone-repressed prostate message 2, apolipoprotein J)	CCCTCCCAGG [C/T] TAAGCTGGG	M	C	T	A	V
G921u3	WIAF-11990	J02908	1051	CLU, clusterin (complement lysis inhibitor, SP-40,40, sulfated glycoprotein 2, testosterone-repressed prostate message 2, apolipoprotein J)	CTCAGCNAAG [G/C] CBAAGACCAG	M	G	C	G	A

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G921u4	WIAF-13469	J02908	986	CLU, clusterin (complement lysis inhibitor, SP-40,40, sulfated glycoprotein 2, testosterone-repressed prostate message 2, apolipoprotein J)	TCAACACCTC [C/T] TCCTTGCTGG	S	C	T	S	S	
G923u1	WIAF-11993	M19650	1059	Human 2',3'-cyclic nucleotide 3'-phosphodiesterase mRNA, complete cds.	GAGCTAAGGC [G/A] GGGCAAGCTC	M	G	A	R	Q	
G923u2	WIAF-11994	M19650	1062	Human 2',3'-cyclic nucleotide 3'-phosphodiesterase mRNA, complete cds.	CTAAGCGGG [G/T] CAAGCTCTAT	M	G	T	G	V	
G923u3	WIAF-13445	M19650	1141	Human 2',3'-cyclic nucleotide 3'-phosphodiesterase mRNA, complete cds.	TCTTCACGGG [G/A] TACTACGGGA	S	G	A	G	G	
G925u1	WIAF-11953	L11315	666	CAK, cell adhesion kinase	GGTCTATGAG [T/C] GTCTGTCTGC	S	T	C	S	S	
G925u2	WIAF-11959	L11315	2562	CAK, cell adhesion kinase	TGCTGCCAT [C/T] CGCTGGATGG	S	C	T	I	I	
G925u3	WIAF-11996	L11315	2049	CAK, cell adhesion kinase	AAGATCTGGT [T/C] AGTCTTGATT	S	T	C	V	V	
G925u4	WIAF-13440	L11315	1601	CAK, cell adhesion kinase	TACCAGGAG [C/T] CGGGCTCGT	M	C	T	P	L	
G925u5	WIAF-13441	L11315	1629	CAK, cell adhesion kinase	CGCCCACTC [C/T] GCTCCTGTG	S	C	T	S	S	
G925u6	WIAF-13451	L11315	2262	CAK, cell adhesion kinase	TGGAGAACGG [C/T] GACCTCAACC	S	C	T	G	G	
G926u1	WIAF-11961	AF018956	577	NRP1, neuropilin 1	TGNAAGCTTT [G/T] ACTTGAGCC	M	G	T	D	Y	
G926u2	WIAF-11963	AF018956	1683	NRP1, neuropilin 1	CCACGGGATT [C/G] ATCAGATCT	M	C	G	F	L	
G926u3	WIAF-11975	AF018956	2176	NRP1, neuropilin 1	GACCTTCTGG [T/C] ATCAGATGC	M	T	C	Y	H	
G926u4	WIAF-11976	AF018956	2092	NRP1, neuropilin 1	TTCCCAAGCT [G/T] ACGAAATCA	M	G	T	D	Y	
G926u5	WIAF-13158	AF018956	747	NRP1, neuropilin 1	TTTTTTACAC [C/T] GACAGCGCA	S	C	T	T	T	
G926u6	WIAF-13159	AF018956	996	NRP1, neuropilin 1	ACTTGGCCT [T/C] CTGCGCTTTG	S	T	C	L	L	
G926u7	WIAF-13444	AF018956	644	NRP1, neuropilin 1	GAATCTGGG [A/C] TGGATTCCCT	M	A	C	D	A	
G926u8	WIAF-13450	AF018956	1738	NRP1, neuropilin 1	CAGAATGGAG [C/G] TGCTGGGCTG	M	C	G	L	V	
G926u9	WIAF-13452	AF018956	537	NRP1, neuropilin 1	TGTCTTTTGG [G/A] CCAAGATGT	S	G	A	A	A	
G926u10	WIAF-13457	AF018956	2197	NRP1, neuropilin 1	TGGGTCCAC [G/A] TCGGCACACT	M	G	A	V	I	
G927u1	WIAF-11978	AF022860	870	NRP2, neuropilin 2	GGATTCTTAA [T/C] GAACAGATCA	S	T	C	N	N	
G927u2	WIAF-11982	AF022860	1674	NRP2, neuropilin 2	ATGACACCCC [T/G] GACATCCGAA	S	T	G	P	P	
G927u3	WIAF-11985	AF022860	1250	NRP2, neuropilin 2	TGGCACTCAG [G/A] TATCGCCCTC	M	G	A	G	D	
G927u4	WIAF-11986	AF022860	1071	NRP2, neuropilin 2	ATGGCTACTA [C/T] GTCNAATCCT	S	C	T	Y	Y	

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G927u5	WIAP-12009	AF022860	726	NRP2, neuropilin 2	GTTTCATCGAC [G/A]GGGATCCTCT	S	G	A	T	T
G927u6	WIAP-12010	AF022860	2522	NRP2, neuropilin 2	GCAACCTCAG [G/T]GTCTGGCCGC	M	G	T	G	V
G927u7	WIAP-12012	AF022860	123	NRP2, neuropilin 2	GCTATATCAC [C/T]TCTCCGGTT	S	C	T	T	T
G927a8	WIAP-13160	AF022860	2427	NRP2, neuropilin 2	CTTTTGCAGT [G/T]GACATCCGAG	S	G	T	V	V
G927a9	WIAP-13161	AF022860	2430	NRP2, neuropilin 2	TTGCATGGA [C/G]ATCCAGAAA	M	C	G	D	E
G927a10	WIAP-13162	AF022860	2463	NRP2, neuropilin 2	RAGGATATGA [A/G]GATGAAATTG	S	A	G	E	E
G927a11	WIAP-13163	AF022860	2473	NRP2, neuropilin 2	AGATGAAATT [G/T]ATGATGAATA	M	G	T	D	Y
G927u12	WIAP-13480	AF022860	724	NRP2, neuropilin 2	TCGTTTCATCG [A/T]CGGGATCCT	M	A	T	T	S
G927u13	WIAP-13481	AF022860	767	NRP2, neuropilin 2	ATGGCGGTGG [C/T]CAAGGATGGC	M	C	T	A	V
G930a1	WIAP-13164	HT2608	609	GABRA2, gamma-aminobutyric acid (GABA) A receptor, alpha 2	ACAATGGGAA [G/A]AAATCAGTAG	S	G	a	K	K
G931a1	WIAP-13153	HT2609	1111	GABRA3, gamma-aminobutyric acid (GABA) A receptor, alpha 3	ACTGGTTCAT [A/G]GCCGCTGTT	M	A	g	I	M
G931a2	WIAP-13165	HT2609	1448	GABRA3, gamma-aminobutyric acid (GABA) A receptor, alpha 3	TGTCAGCAAG [G/A]TTGACAAAAT	M	G	A	V	I
G932a1	WIAP-13154	HT27773	1077	GABRA4, gamma-aminobutyric acid (GABA) A receptor, alpha 4	CAAAAGAAAG [A/G]CATCAAGGCC	M	A	G	T	A
G932a2	WIAP-13155	HT27773	1189	GABRA4, gamma-aminobutyric acid (GABA) A receptor, alpha 4	AGAACAATAG [C/A]TTTGCTTCAC	M	C	A	A	D
G936u1	WIAP-12308	HT3432	1027	GABRB2, gamma-aminobutyric acid (GABA) A receptor, beta 2	AATTACGATG [C/T]TTCAGCTGCA	M	C	T	A	V
G936u2	WIAP-12327	HT3432	362	GABRB2, gamma-aminobutyric acid (GABA) A receptor, beta 2	AAGGCTATGA [C/T]ATTCTCTGA	S	C	T	D	D
G936u3	WIAP-12328	HT3432	571	GABRB2, gamma-aminobutyric acid (GABA) A receptor, beta 2	CTCTGGGTGC [C/T]TGATACCTAT	M	C	T	P	L
G939u1	WIAP-12330	HT2236	1219	GABRR2, gamma-aminobutyric acid (GABA) receptor, rho 2	CTGGATGGAA [G/C]CTACAGTGAG	M	G	C	S	T
G939u2	WIAP-12355	HT2236	1003	GABRR2, gamma-aminobutyric acid (GABA) receptor, rho 2	ACCACCATCA [T/C]CAGGGCGTG	M	T	C	I	T

G939u3	WIAF-12356	HT2236		1041	GABRR2, gamma-aminobutyric acid (GABA) receptor, rho 2	CGTCTCTTAC [G/A] TCAAGGCCGT	M	G	A	V	I
G950u1	WIAF-13622	U64871		785	Human putative G protein-coupled receptor (GPR19) gene, complete cds.	GTCTGTCTCC [A/C] GTTCACCACT	M	A	C	Q	P
G950u2	WIAF-13624	U64871		443	Human putative G protein-coupled receptor (GPR19) gene, complete cds.	GATAACAGCA [A/C] GCCACATTG	M	A	C	K	T
G950u3	WIAF-13625	U64871		818	Human putative G protein-coupled receptor (GPR19) gene, complete cds.	CTGGTACTG [C/T] AACGTGCAAG	M	C	T	A	V
G955a1	WIAF-13166	HT3860		5110	calcium channel, voltage-gated, alpha 1 subunit, L type, alt. transcript 1	CTGGCTCTTT [T/C] ACCGTGGAGA	S	T	C	P	F
G955a2	WIAF-13167	HT3860		3842	calcium channel, voltage-gated, alpha 1 subunit, L type, alt. transcript 1	CTACCCCAAC [C/A] CAGAAACTAC	M	C	A	P	T
G955a3	WIAF-13168	HT3860		5624	calcium channel, voltage-gated, alpha 1 subunit, L type, alt. transcript 1	GTGTGCCCA [G/A] AGTCCGAGCC	M	G	A	E	K
G955a4	WIAF-13169	HT3860		5703	calcium channel, voltage-gated, alpha 1 subunit, L type, alt. transcript 1	ATCAGCTTCT [A/G] CATGCTCTGT	M	A	G	Y	C
G955a5	WIAF-13170	HT3860		5809	calcium channel, voltage-gated, alpha 1 subunit, L type, alt. transcript 1	ACCACCTGGA [T/C] GAGTTTAAA	S	T	C	D	D
G955a6	WIAF-13171	HT3860		6616	calcium channel, voltage-gated, alpha 1 subunit, L type, alt. transcript 1	CCGGCTCCAA [C/T] GCCAACATCA	S	C	T	N	N
G956u1	WIAF-14187	HT2199		1334	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	CTTCACATAG [C/T] CCTTTTGTA	M	C	T	A	V
G956u2	WIAF-14188	HT2199		1452	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	AAGAGGACCC [A/T] GCTCCATGTG	S	A	T	P	P
G956u3	WIAF-14189	HT2199		1614	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	GCTGGACAGA [C/T] GTGCTCTACT	S	C	T	D	D

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G956u4	WIAF-14190	HT2199	2540	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	GGCAAGTTTA [A/T] TTTTGATGAA	M	A	T	N	I
G956u5	WIAF-14191	HT2199	3210	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	TGCTGAGCAG [T/C] GCTGCCCTGG	S	T	C	S	S
G956u6	WIAF-14192	HT2199	3326	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	TTGAAGATGA [C/T] AACTTTTGGA	M	C	T	T	I
G956u7	WIAF-14193	HT2199	3274	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	ACTGGGTTAC [T/C] TTGACTATGC	M	T	C	F	L
G956u8	WIAF-14194	HT2199	5127	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	TGCCTCTCAA [C/T] AGTGACGGGA	S	C	T	N	N
G956u9	WIAF-14195	HT2199	5173	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	TGCTTTGGTT [C/T] GAACGGCTCT	N	C	T	R	*
G956u10	WIAF-14200	HT2199	1437	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	CAGATATCGT [A/G] GCTGAAGAGG	S	A	G	V	V
G956u11	WIAF-14201	HT2199	2567	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	ACCAAGCGGA [G/T] CACCTTTGAC	M	G	T	S	I
G956u12	WIAF-14202	HT2199	4464	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	TCACCTTTTT [C/T] CGTCTTTTCC	S	C	T	F	F
G956u13	WIAF-14215	HT2199	6927	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	GCTACAGCGA [C/T] GAAGAGCCAG	S	C	T	D	D
G956u14	WIAF-14216	HT2199	6858	calcium channel, voltage-gated, alpha 1D subunit, DHP-sensitive	CCCGAGCCAA [C/T] GGGGATGTGG	S	C	T	N	N
G957u1	WIAF-12306	HT4229	915 <sup>2</sup>	calcium channel, voltage-gated, alpha 1E subunit, alt. transcript	TACATCGAGC [G/A] TGCTTCATGA	M	G	A	?	R
G957u2	WIAF-12309	HT4229	3555 <sup>2</sup>	calcium channel, voltage-gated, alpha 1E subunit, alt. transcript	GCCACTACAT [C/T] GTGAACCTGC	S	C	T	I	I

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G957u3	WIAF-12310	HT4229		calcium channel, voltage-gated, alpha 1E subunit, alt. transcript	4116 2	ATGTAGATCA [C/T] GAGAAAACA	S	C	T	H	H
G957u4	WIAF-12313	HT4229		calcium channel, voltage-gated, alpha 1E subunit, alt. transcript	5181 2	AGAACGAGAA [T/C] GACGCTGG	S	T	C	N	N
G957u5	WIAF-12314	HT4229		calcium channel, voltage-gated, alpha 1E subunit, alt. transcript	5971 2	TATGGACCCC [G/A] CCGATGACGG	S	G	A	T	T
G957u6	WIAF-12315	HT4229		calcium channel, voltage-gated, alpha 1E subunit, alt. transcript	5985 2	ATGACGGACA [G/T] TTCCAAGAAC	M	G	T	Q	H
G957u7	WIAF-12329	HT4229		calcium channel, voltage-gated, alpha 1E subunit, alt. transcript	3100 2	GCTGGCAGGA [G/A] GCCTTGATGA	M	G	A	G	S
G957u8	WIAF-12331	HT4229		calcium channel, voltage-gated, alpha 1E subunit, alt. transcript	6492 2	CCCTCCTTTC [C/T] TACAGCTCCC	M	C	T	?	R
G957u9	WIAF-12354	HT4229		calcium channel, voltage-gated, alpha 1E subunit, alt. transcript	3839 2	AACGCTTTGG [G/C] AACCAACAAA	M	G	C	G	A
G957u10	WIAF-12357	HT4229		calcium channel, voltage-gated, alpha 1E subunit, alt. transcript	4753 2	TGACTTCATC [A/G] CCGTGATTGG	M	A	G	T	A
G960u1	WIAF-12305	HT3336		CACNB3, calcium channel, voltage- dependent, beta 3 subunit	1246	TTGATGCCCT [C/T] TGATGAGGCC	M	C	T	S	P
G960u2	WIAF-12340	HT3336		CACNB3, calcium channel, voltage- dependent, beta 3 subunit	1288	TGGACAGGAT [C/T] TTCACAGCGT	M	C	T	S	P
G960u3	WIAF-12345	HT3336		CACNB3, calcium channel, voltage- dependent, beta 3 subunit	641	AGGCTCTCTT [C/T] GACTTCCTCA	S	C	T	P	P
G960u4	WIAF-12346	HT3336		CACNB3, calcium channel, voltage- dependent, beta 3 subunit	576	CATCGCGCCT [G/A] TGGTGCTGGT	M	G	A	V	M
G961u1	WIAF-12322	U95019		CACNB2, calcium channel, voltage- dependent, beta 2 subunit	2037	ACTCTGCCCTA [C/T] GTAGAGCCAA	S	C	T	Y	Y

G961u2	WIAF-12347	U95019	2007	CACNB2, calcium channel, voltage-dependent, beta 2 subunit	CATTGACTC[G/A]GAAACCCAGG	S	G	A	S	S
G962u1	WIAF-12324	U95020	1423	CACNB4, calcium channel, voltage-dependent, beta 4 subunit	CCAATTGAAA[G/A]ACGAAGTCTA	M	G	A	R	K
G962u2	WIAF-12342	U95020	167	CACNB4, calcium channel, voltage-dependent, beta 4 subunit	GGAGCAGGTT[G/T]AAAGATCCG	M	G	T	L	F
G962u3	WIAF-12350	U95020	1571	CACNB4, calcium channel, voltage-dependent, beta 4 subunit	ACACTTACAA[A/G]CCCCATAGGA	S	A	G	K	K
G965u1	WIAF-12312	U40583	1276	CHRNA7, cholinergic receptor, nicotinic, alpha polypeptide 7	TCCTGCACGG[T/C]GGCAACCCC	S	T	C	G	G
G968a1	WIAF-12119	HT27592	1008	CHRNA1, cholinergic receptor, nicotinic, alpha polypeptide 1 (muscle)	ACACACACCA[C/T]CGCTCACCCA	S	C	T	H	H
G968u2	WIAF-12368	HT27592	1136	CHRNA1, cholinergic receptor, nicotinic, alpha polypeptide 1 (muscle)	AAGATTTTAA[C/T]AGAAGACATT	M	C	T	T	I
G973a1	WIAF-13172	HT48774	800	CHRNA2, cholinergic receptor, nicotinic, alpha polypeptide 2 (neuronal)	ACACTTCAGA[C/T]GTGGTGATTG	S	C	C	D	D
G973a2	WIAF-13173	HT48774	927	CHRNA2, cholinergic receptor, nicotinic, alpha polypeptide 2 (neuronal)	CTGGAACCCC[G/A]CTGATTTTGG	M	G	A	A	T
G977u1	WIAF-13949	Y08419	366	CHRNA5, cholinergic receptor, nicotinic, alpha polypeptide 5	AAGTTATACG[T/C]GTTCTTCAG	S	T	C	R	R
G978a1	WIAF-13179	Y08417	1331	CHRNA3, cholinergic receptor, nicotinic, beta polypeptide 3	CCATTAGATA[C/A]ATTTCGAGAC	N	C	A	Y	*
G983a1	WIAF-13214	HT0374	236	NPY, neuropeptide Y	GATACACTC[G/A]GCGCTGGAC	S	G	A	S	S
G983a2	WIAF-13215	HT0374	290	NPY, neuropeptide Y	GAACACGATC[C/T]AGCCGAGAGA	S	C	T	S	S
G983a3	WIAF-13216	HT0374	111	NPY, neuropeptide Y	CGGACTGGGG[C/T]TGTCGGGACT	S	C	T	L	L
G987a1	WIAF-13174	HT27830	159	PPYR1, pancreatic polypeptide receptor 1	TGGTCTTCAT[C/T]GTCACTTCCT	S	C	T	I	I

G987a2	WIAP-13175	HT27830		PPYR1, pancreatic polypeptide receptor 1	222	TGATGTGTGT [G/A] ACTGTGAGGC	S	G	A	V	V
G987a3	WIAP-13176	HT27830		PPYR1, pancreatic polypeptide receptor 1	322	GCAGCTGACC [G/T] CGGTCTACAC	M	G	T	A	S
G987a4	WIAP-13177	HT27830		PPYR1, pancreatic polypeptide receptor 1	1074	TGAGGAGTTC [G/A] GAGCATCTGC	S	G	A	S	S
G987a5	WIAP-13178	HT27830		PPYR1, pancreatic polypeptide receptor 1	975	CCTCCACCTG [C/T] GTCAACCCAT	S	C	T	C	C
G987a6	WIAP-13180	HT27830		PPYR1, pancreatic polypeptide receptor 1	615	AGTTCTCTGGC [A/G] GATAAGGTGG	S	A	G	A	A
G987a7	WIAP-13181	HT27830		PPYR1, pancreatic polypeptide receptor 1	718	GGCTTCATC [C/T] TGCTCTGTTA	S	C	T	L	L
G987a8	WIAP-13182	HT27830		PPYR1, pancreatic polypeptide receptor 1	745	CATCTACCGG [C/C] GCCTGCAGAG	M	C	T	R	C
G987a9	WIAP-13183	HT27830		PPYR1, pancreatic polypeptide receptor 1	842	GTGATGTGTG [T/A] GGCCTTTGCC	M	T	A	V	E
G987a10	WIAP-13184	HT27830		PPYR1, pancreatic polypeptide receptor 1	852	TGCGCTTTGC [C/T] GTGCTCTGGC	S	C	T	A	A
G987a11	WIAP-13185	HT27830		PPYR1, pancreatic polypeptide receptor 1	889	CAACAGCCTG [G/A] AAGACTGGCA	M	G	A	S	K
G987a12	WIAP-13186	HT27830		PPYR1, pancreatic polypeptide receptor 1	924	CCATCTGCCA [C/T] GGGAACTCA	S	C	T	H	H
G989u1	WIAP-13573	D86519		NPY6R, neuropeptide Y receptor Y6	891	TGACTCATGC [C/T] TACTGGGCA	S	C	T	A	A
G989u2	WIAP-13588	D86519		NPY6R, neuropeptide Y receptor Y6	465	ACCACCCAGC [A/G] TCTAATACAA	S	A	G	A	A
G989u3	WIAP-13591	D86519		NPY6R, neuropeptide Y receptor Y6	980	GAGCCCTTCC [G/A] CAACCTCTCT	M	G	A	R	H
G991u1	WIAP-12390	HT97376		Notch2	336	AAGTACTTGT [C/T] GTTCAGAAAA	S	C	T	C	C
G993u1	WIAP-12359	U95299		NOTCH4, Notch (Drosophila) homolog 4	1343	TCCACACTCT [G/T] CCTGTGTGAG	M	G	T	C	F
G993u2	WIAP-12361	U95299		NOTCH4, Notch (Drosophila) homolog 4	2020	TAAGGACCAG [A/G] AAGACAGGC	M	A	G	K	E
G993u3	WIAP-12384	U95299		NOTCH4, Notch (Drosophila) homolog 4	5775	GGGCTATTTC [G/T] CATTTGCCGA	S	G	T	S	S
G996a1	WIAP-13213	HT3329		OPRM1, opioid receptor, mu 1	356	CTTAGATGGC [A/G] ACCTGTCCGA	M	A	G	N	D
LPLa4	WIAP-13314	HT1320		LPL, lipoprotein lipase	443	ATGTATGAGA [G/T] TTGGGTGCCA	M	G	T	S	I
LPLa5	WIAP-13315	HT1320		LPL, lipoprotein lipase	579	GACAGGATGT [G/A] GCCCGGTTTA	S	G	A	V	V



LPLa6	WIAP-13316	HT1320	609 LPL, lipoprotein lipase	TGGAGGAGGA [G/A] TTTAACTACC	S	G	A	E	B
LPLa7	WIAP-13317	HT1320	1338 LPL, lipoprotein lipase	CAATAAGAC [C/A] TACTCCTTCC	S	C	A	T	T
LPLa8	WIAP-13318	HT1320	1117 LPL, lipoprotein lipase	CAATCTGGGC [T/G] ATGAGATCAA	M	T	G	Y	D
LPLa9	WIAP-13319	HT1320	715 LPL, lipoprotein lipase	CAGAATTACT [G/A] GCCTCGATCC	M	G	A	G	S
LPLa10	WIAP-13320	HT1320	834 LPL, lipoprotein lipase	CTGCTCGAAG [C/A] ATTGGAATCC	M	C	A	S	R
LPLa11	WIAP-13321	HT1320	951 LPL, lipoprotein lipase	GACTTGGAGA [T/A] GTGGACCAGC	M	T	A	D	E
LPLa12	WIAP-13322	HT1320	1595 LPL, lipoprotein lipase	AATAAGAAAT [C/G] AGGCTGAAC	N	C	G	S	*
LPLa13	WIAP-13323	HT1320	1597 LPL, lipoprotein lipase	TAAAGAAATCA [G/A] GCTGAAACTG	M	G	A	G	S
LPLa14	WIAP-13324	HT1320	1606 LPL, lipoprotein lipase	AGGCTGAATAC [T/C] GGGGCAATCT	-	T	C	-	-
LPLa15	WIAP-13325	HT1320	1611 LPL, lipoprotein lipase	GAACTGGGC [G/A] AATCTACAGA	-	G	A	-	-

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While this invention has been particularly shown and described with references to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the scope of the invention encompassed by the appended claims.

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## CLAIMS

## WE CLAIM:

1. A method of diagnosing or aiding in the diagnosis of a vascular disease in an individual comprising
  - 5 a) obtaining a nucleic acid sample from the individual; and
  - b) determining the nucleotide present at nucleotide position 2210 of the thrombospondin-1 gene,  
wherein presence of a G at nucleotide position 2210 is indicative of increased likelihood of a vascular disease in the individual as compared with an  
10 individual having an A at nucleotide position 2210.
2. The method of Claim 1, wherein the thrombospondin-1 gene has the nucleotide sequence of SEQ ID NO: 1.
3. The method of Claim 1, wherein the vascular disease is selected from the group consisting of atherosclerosis, coronary heart disease, myocardial  
15 infarction, stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism.
4. The method of Claim 3, wherein the vascular disease is myocardial infarction.
5. The method of Claim 3, wherein the vascular disease is coronary heart disease.
6. A method of diagnosing or aiding in the diagnosis of a vascular disease in an  
20 individual comprising
  - a) obtaining a nucleic acid sample from the individual; and
  - b) determining the nucleotide present at nucleotide position 2210 of the thrombospondin-1 gene,

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wherein presence of an A at nucleotide position 2210 is indicative of decreased likelihood of a vascular disease in the individual as compared with an individual having a G at nucleotide position 2210.

- 5 7. The method according to Claim 6, wherein the thrombospondin-1 gene has the nucleotide sequence of SEQ ID NO: 1.
8. The method according to Claim 6, wherein the vascular disease is selected from the group consisting of atherosclerosis, coronary heart disease, myocardial infarction, stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism.
- 10 9. The method according to Claim 8, wherein the vascular disease is myocardial infarction.
10. The method according to Claim 8, wherein the vascular disease is coronary heart disease.
11. A method for predicting the likelihood that an individual will have a vascular  
15 disease, comprising the steps of:
  - a) obtaining a DNA sample from an individual to be assessed; and
  - b) determining the nucleotide present at nucleotide position 2210 of the thrombospondin-1 gene,wherein presence of a G at nucleotide position 2210 is indicative of increased  
20 likelihood of a vascular disease in the individual as compared with an individual having an A at nucleotide position 2210.
12. The method according to Claim 11, wherein the thrombospondin-1 gene has the nucleotide sequence of SEQ ID NO: 1.
13. The method according to Claim 11, wherein the individual is an individual at  
25 risk for development of a vascular disease.

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14. The method according to Claim 11, wherein the vascular disease is selected from the group consisting of atherosclerosis, coronary heart disease, myocardial infarction, stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism.
- 5 15. The method according to Claim 14, wherein the vascular disease is myocardial infarction.
16. The method according to Claim 14, wherein the vascular disease is coronary heart disease.
- 10 17. A nucleic acid molecule comprising all or a portion of the nucleic acid sequence of SEQ ID NO: 1 wherein said nucleic acid molecule is at least 10 nucleotides in length and wherein the nucleic acid sequence comprises a polymorphic site at nucleotide position 2210 of SEQ ID NO: 1.
- 15 18. The nucleic acid molecule according to Claim 17, wherein the nucleotide at the polymorphic site is different from a nucleotide at the polymorphic site in a corresponding reference allele.
19. An allele-specific oligonucleotide that hybridizes to the nucleic acid molecule of Claim 17.
- 20 20. A peptide of SEQ ID NO: 2 which is at least ten contiguous amino acids, wherein the peptide comprises the serine at amino acid position 700 of SEQ ID NO: 2.
21. A method of diagnosing or aiding in the diagnosis of a vascular disease in an individual comprising
  - a) obtaining a biological sample comprising thrombospondin-1 protein or relevant portion thereof from the individual; and

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- b) determining the amino acid present at amino acid position 700 of the thrombospondin-1 protein,  
wherein presence of an asparagine at amino acid position 700 is indicative of increased likelihood of a vascular disease in the individual as compared with  
5 an individual having a serine at amino acid position 700.
22. The method of Claim 21, wherein the thrombospondin-1 protein has the amino acid sequence of SEQ ID NO: 2.
23. The method of Claim 22, wherein the vascular disease is selected from the group consisting of atherosclerosis, coronary heart disease, myocardial  
10 infarction, stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism.
24. The method of Claim 23, wherein the vascular disease is myocardial infarction.
25. The method of Claim 23, wherein the vascular disease is coronary heart  
15 disease.
26. A method of diagnosing or aiding in the diagnosis of a vascular disease in an individual comprising
- a) obtaining a biological sample comprising thrombospondin-1 protein or relevant portion thereof from the individual; and
- 20 b) determining the amino acid present at amino acid position 700 of the thrombospondin-1 protein,  
wherein presence of a serine at amino acid position 700 is indicative of reduced likelihood of a vascular disease in the individual as compared with an individual having an asparagine at amino acid position 700.
- 25 27. The method according to Claim 26, wherein the thrombospondin-1 protein has the amino acid sequence of SEQ ID NO: 2.

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28. The method according to Claim 26, wherein the vascular disease is selected from the group consisting of atherosclerosis, coronary heart disease, myocardial infarction, stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism.
- 5 29. The method of Claim 28, wherein the vascular disease is myocardial infarction.
30. The method of Claim 28, wherein the vascular disease is coronary heart disease.
- 10 31. A method of diagnosing or aiding in the diagnosis of a vascular disease in an individual comprising
- a) obtaining a nucleic acid sample from the individual; and
  - b) determining the nucleotide present at nucleotide position 1186 of the thrombospondin-4 gene,
- 15 wherein presence of a C at nucleotide position 1186 is indicative of increased likelihood of a vascular disease in the individual as compared with an individual having an G at nucleotide position 1186.
32. The method of Claim 31, wherein the thrombospondin-4 gene has the nucleotide sequence of SEQ ID NO: 3.
- 20 33. The method of Claim 31, wherein the vascular disease is selected from the group consisting of atherosclerosis, coronary heart disease, myocardial infarction, stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism.
34. The method of Claim 33, wherein the vascular disease is myocardial infarction.



35. The method of Claim 33, wherein the vascular disease is coronary heart disease.
36. A method of diagnosing or aiding in the diagnosis of a vascular disease in an individual comprising
- 5 a) obtaining a nucleic acid sample from the individual; and
- b) determining the nucleotide present at nucleotide position 1186 of the thrombospondin-4 gene,
- wherein presence of a G at nucleotide position 1186 is indicative of decreased likelihood of a vascular disease in the individual as compared with an
- 10 individual having a C at nucleotide position 1186.
37. The method according to Claim 36, wherein the thrombospondin-4 gene has the nucleotide sequence of SEQ ID NO: 3.
38. The method according to Claim 36, wherein the vascular disease is selected from the group consisting of atherosclerosis, coronary heart disease,
- 15 myocardial infarction, stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism.
39. The method according to Claim 38, wherein the vascular disease is myocardial infarction.
40. The method according to Claim 38, wherein the vascular disease is coronary
- 20 heart disease.
41. A method for predicting the likelihood that an individual will have a vascular disease, comprising the steps of:
- a) obtaining a DNA sample from an individual to be assessed; and
- 25 b) determining the nucleotide present at nucleotide position 1186 of the thrombospondin-4 gene,

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wherein presence of a C at nucleotide position 1186 is indicative of increased likelihood of a vascular disease in the individual as compared with an individual having a G at nucleotide position 1186.

42. The method according to Claim 41, wherein the thrombospondin-4 gene has  
5 the nucleotide sequence of SEQ ID NO: 3.
43. The method according to Claim 41, wherein the individual is an individual at risk for development of a vascular disease.
44. The method according to Claim 41, wherein the vascular disease is selected  
10 from the group consisting of atherosclerosis, coronary heart disease, myocardial infarction, stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism.
45. The method according to Claim 44, wherein the vascular disease is myocardial infarction.
46. The method according to Claim 44, wherein the vascular disease is coronary  
15 heart disease.
47. A nucleic acid molecule comprising all or a portion of the nucleic acid sequence of SEQ ID NO: 3 wherein said nucleic acid molecule is at least 10 nucleotides in length and wherein the nucleic acid sequence comprises a polymorphic site at nucleotide position 1186 of SEQ ID NO: 3.
- 20 48. The nucleic acid molecule according to Claim 47, wherein the nucleotide at the polymorphic site is different from a nucleotide at the polymorphic site in a corresponding reference allele.
49. An allele-specific oligonucleotide that hybridizes to the nucleic acid molecule of Claim 47.

50. A peptide of SEQ ID NO: 4 which is at least ten contiguous amino acids, wherein the peptide comprises the proline at amino acid position 387 of SEQ ID NO: 4.
51. A method of diagnosing or aiding in the diagnosis of a vascular disease in an individual comprising
- 5 a) obtaining a biological sample comprising thrombospondin-4 protein or relevant portion thereof from the individual; and
- b) determining the amino acid present at amino acid position 387 of the thrombospondin-4 protein,
- 10 wherein presence of an alanine at amino acid position 387 is indicative of increased likelihood of a vascular disease in the individual as compared with an individual having a proline at amino acid position 387.
52. The method of Claim 51, wherein the thrombospondin-4 protein has the amino acid sequence of SEQ ID NO: 4.
- 15 53. The method of Claim 52, wherein the vascular disease is selected from the group consisting of atherosclerosis, coronary heart disease, myocardial infarction, stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism.
54. The method of Claim 53, wherein the vascular disease is myocardial infarction.
- 20 55. The method of Claim 53, wherein the vascular disease is coronary heart disease.
56. A method of diagnosing or aiding in the diagnosis of a vascular disease in an individual comprising

- a) obtaining a biological sample comprising thrombospondin-4 protein or relevant portion thereof from the individual; and
  - b) determining the amino acid present at amino acid position 387 of the thrombospondin-4 protein,
- 5 wherein presence of a proline at amino acid position 387 is indicative of reduced likelihood of a vascular disease in the individual as compared with an individual having an alanine at amino acid position 387.
57. The method according to Claim 56, wherein the thrombospondin-4 protein has the amino acid sequence of SEQ ID NO: 4.
- 10 58. The method according to Claim 56, wherein the vascular disease is selected from the group consisting of atherosclerosis, coronary heart disease, myocardial infarction, stroke, peripheral vascular diseases, venous thromboembolism and pulmonary embolism.
- 15 59. The method of Claim 58, wherein the vascular disease is myocardial infarction.
60. The method of Claim 58, wherein the vascular disease is coronary heart disease.
- 20 61. A nucleic acid molecule selected from the group consisting of the genes listed in the Table, wherein said nucleic acid molecule is at least 10 nucleotides in length and comprises a polymorphic site identified in the Table, wherein a nucleotide at the polymorphic site is different from a nucleotide at the polymorphic site in a corresponding reference allele.
- 25 62. A nucleic acid molecule according to Claim 61, wherein said nucleic acid molecule is at least 15 nucleotides in length.

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63. A nucleic acid molecule according to Claim 61, wherein said nucleic acid molecule is at least 20 nucleotides in length.
64. A nucleic acid molecule according to Claim 61, wherein the nucleotide at the polymorphic site is the variant nucleotide for the gene listed in the Table.
- 5 65. An allele-specific oligonucleotide that hybridizes to a portion of a gene selected from the group consisting of the genes listed in the Table, wherein said portion is at least 10 nucleotides in length and comprises a polymorphic site identified in the Table, wherein a nucleotide at the polymorphic site is different from a nucleotide at the polymorphic site in a corresponding  
10 reference allele.
66. An allele-specific oligonucleotide according to Claim 65 that is a probe.
67. An allele-specific oligonucleotide according to Claim 65, wherein a central position of the probe aligns with the polymorphic site of the portion.
68. An allele-specific oligonucleotide according to Claim 65 that is a primer.
- 15 69. An allele-specific oligonucleotide according to Claim 68, wherein the 3' end of the primer aligns with the polymorphic site of the portion.
70. An isolated gene product encoded by a nucleic acid molecule according to Claim 61.
- 20 71. A method of analyzing a nucleic acid sample, comprising obtaining the nucleic acid sample from an individual; and determining a base occupying any one of the polymorphic sites shown in the Table.
72. A method according to Claim 71, wherein the nucleic acid sample is obtained from a plurality of individuals, and a base occupying one of the polymorphic

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positions is determined in each of the individuals, and wherein the method further comprising testing each individual for the presence of a disease phenotype, and correlating the presence of the disease phenotype with the base.

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## HT1220 Report

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### RECORD INFORMATION

Gene ID:	1220
Sequence ID:	1220
Protein ID:	1220
Sequence name:	thrombospondin 1, alt. transcript 1
Genome:	nucleus
Taxon:	Homo sapiens
Locus:	1220
Common Name:	thrombospondin 1
Role ID:	40

Coding sequence length:	3513 nt
Transcript sequence length:	5722 nt
Expression data:	<u>481987</u>

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### ACCESSION DATA

HT1220 is derived from accessions(s):

SP:P07996 (THROMBOSPONDIN 1 PRECURSOR.)  
GB:X04665 (Human mRNA for thrombospondin)  
GB:X14787 (Human mRNA for thrombospondin)  
GB:U12471 (thrombospondin-p50 {Homo sapiens})  
GB:M99425 (Human thrombospondin mRNA, 3' end.)  
PIR:G01478 (thrombospondin-p50 - human (fragment))  
GB:U12471 (Human thrombospondin-1 gene, partial cds.)  
GB:J04835 (Human thrombospondin gene, exons 1, 2 and 3.)  
GB:M25631 (Homo sapiens (clone lambda-TS-33) thrombospondin (THBS) mRNA, 5' end.)

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### ALTERNATIVE SPLICE INFORMATION

Alternative splice forms for this gene:

HT3987 thrombospondin 1, alt. transcript 2

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### MAPPING DATA

GDB accession(s) for this gene:

GDB ID:	Symbol
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Figure 1A

gdb:120438 THBS1

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**cDNA FEATURES**

Feature	End 5	End 3
coding_seq	112	3624
3'UT	3625	5722
spjunc_h	1235	1236

**SEQUENCE****nucleotide:**

ggacgcacaggcattccccgcgcccctccagccctcgccgccctcgccaccgctcccggc  
 cgccgcgctccggtacacacaggatccctgctgggcaccaacagctccaccatggggctg  
 gcctggggactaggcgctcctgttctctgatgcatgtgtgtggcaccaaccgcattccagag  
 tctggcggagacaacagcggtgtttgacatctttgaactcaccggggccgcccgaagggg  
 tctgggcgcccgaactggtgaaggcccccgacccttccagcccagcttccgcacgaggat  
 gccaaacctgatccccctgtgcctgatgacaagtccaagacctgggtggatgctgtgcgg  
 gcagaaaagggtttctctcttctggcatccctgaggcagatgaagaagacccggggcacg  
 ctgctggccctggagcggaaagaccactctggccaggtcttcagcgtggtgtccaatggc  
 aaggcgggcaccctggacctcagcctgaccgtccaaggaaagcagcagctgggtgtctgtg  
 gaagaagctctcctggcaaccggccagtggaagagcatcaccctgtttgtgcaggaagac  
 agggcccagctgtacatcgactgtgaaaagatggagaatgctgagttggacgtccccatc  
 caaagcgtcttcaccagagacctggccagcatcgccagactccgcatcgaaaggggggc  
 gtcaatgacaatttccagggggtgctgcagaatgtgaggtttgtctttggaaccacacca  
 gaagacatcctcaggaacaaaggctgctccagctctaccagtgtcctcctcacccttgac  
 aacaacgtggtgaatggttccagccctgccatccgcactaactacattggccacaagaca  
 aaggacttgcaagccatctgcggcatctcctgtgatgagctgtccagcatggtcctggaa  
 ctcaggggctgcgccaccattgtgaccacgctgcaggacagcatccgcaaagtgactgaa  
 gagaacaaagagttggccaatgagctgaggcggcctccctatgctatcacaacggagt  
 cagtacagaaataacgaggaatggactgttgatagctgcactgagtgctactgtcagaac  
 tcagttaccatctgcaaaaagggtgtcctgccccatcatgccctgtccaatgccacagtt  
 cctgatggagaatgctgtcctcgctgttggcccagcagctctgcggacgatggctggtct  
 ccatgggtccgagtggaacctcctgttctacgagctgtggcaatggaattcagcagcgggc  
 cgctcctgcatagcctcaacaaccgatgtgagggtcctcggtccagacacggacctgc  
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 tggatcatctgttctgtgacatgtggtgatggtgtgatcacaaggatccggctctgcaac  
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 gactatgacagagatgatgtgggagaccgctgtgacaactgtccctacaaccacaacca

Figure 1B



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gatcaggcagacacagacaacaatggggaaggagacgcctgtgctgcagacattgatgga  
 gacgggtatcctcaatgaacgggacaactgccagtacgtctacaatgtggaccagagagac  
 actgatatggatgggggtggagatcagtggtgacaattgcccttggaaacacaatccggat  
 cagctggactctgactcagaccgcattggagatacctgtgacaacaatcaggatattgat  
 gaagatggccaccagaacaatctggacaactgtccctatgtgccaatgccaaccaggct  
 gaccatgacaaagatggcaaggagatgcctgtgaccacgatgatgacaacgatggcatt  
 cctgatgacaaggacaactgcagactcgtgccaatcccaccagaaggactctgacggc  
 gatggctcgaggatgacctgcaaagatgattttgaccatgacagtgtgccagacatcgat  
 gacatctgtcctgagaatgttgacatcagtgagaccgatttccgccgattccagatgatt  
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 ggatttgtctttggctaccagtccagcagccgcttttatgttgtgatgtggaagcaagtc  
 acccagtcctactgggacaccaacccacgagggctcagggatactcgggccttctgtg  
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 agaattagcaaaaacacccctgacatcctcctcaggaacacggggagcagaggcca  
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 aataggaaaacctaccatctcagtgagcaccagctgcctcccaaggaggggcagccgtg  
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 cttcgtgactgtaagattgtaaatacagattatttattaaactctgttctgcctggaaatt  
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 caagaacagcacaaggaaaatcagctctaataagctgctctgccccttgtgctcagagtgg  
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 ttcccaataaggaaatagcattgaaatgttaaatacaatttctgaaagttatgtttttt  
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 agagtttagtatttctattttttatataatgttttgacactgaattgaagaattgttgggtt  
 tttctttttttgtttttttttttttttttttttttgtctttgacctccattttta  
 ctatttgccaatacctttttctaggaatgtgctttttttgtacacatttttatccattt  
 tacattctaagcagtgtaagttgtatattactgtttcttatgtacaaggaacaacaata  
 aatcatatggaaatttatattt

**protein:**

MGLAWGLGVFLMHVCGTNRIPESSGDNVSFDIFELTGAARKGSGRRLVKGPDPSSPAFR

Figure 1C

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IEDANLIIPPVPDDKFQDLVDAVRAEKGFLLLASLRQMKTGRTLLALERKDHSGQVFSVV  
SNGKAGTLDLSLTVQKGQHVVSVEEALLATGQWKSITLTVQEDRAQLYIDCEKMENAELD  
VPIQSVFTRDLAS IARLRIAXGGVNDNFQGV LQNVRFVFGTT PEDILRNKGCSSSTS VLL  
TLDNNVVGSSPAIRTNYIGHKTDLQAICGISCELSMVLELRGLRTIVTTLQDSIRK  
VTEENKELANELRRPPLCYHNGVQYRNNEEWTVDSCTECHCQNSVTICKKVSCPIMPSCN  
ATVPDGECCPRCWPSPDSADDGWS PWSEWTS CSTSCGNGIQQRGRSCDSLNNRCEGSSVQT  
RTCHIQECDKRFKQDGGWSHSPWSSCSVT CGDGVITRIRLCNSPSPQMNGKPCGEARE  
TKACKKDACP INGGWGPWSPWDICSVTCGGGVQKRSRLCNNPAPQFGGKDCVGDVTENQI  
CNKQDCPIDGCLSNPCFAGVKCTSYPDGSKGACPPGYSGNGIQCTDVDECKEVPDACF  
NHNGEHRCENTDPGYNCLPCPPRFTGSQPFQGVGHATANKQVCKPRNPCTDGTDCNKN  
AKCNYLGHYSDPMYRCECKPGYAGNGIICGEDTDLGWPNNENLVCVANATYHCKKDNCPN  
LPNSGQEDYDKDIGDACCDDDDNDKI PDDRDNC PFHYNPAQYDYDRDDVGDRCDCNCPYN  
HNPDAQADTDNNGEGDACAADIDGDGILNERDNCQYVYNVDQRDTMDGVGDQCDNCPLEH  
NPDQLDSDSDRIGDTCNNQDIDEDGHNNDLNCYVVPANQADEDKDGKGDACDHHDDN  
DGIPDDKDNCR LVPNPDQKSDGDGRGDACKDDFDHDSVPDIDDICPENVDISETDFRFR  
QMIPLDPKGT SQNDPNWVVRHQGKELVQTVNCDPGLAVGYDEFNAVDFSGTFFINTERDD  
DYAGFVFGYQSSSRFYVVMWKQVTQSYWDTNPTRAQGYSGLSVKVNSTTGPGEHLRNAL  
WHTGNTPGQVRTLWHDPRHIGWKDFTAYRWRLSHRPKTGFI RVMYEGKKIMADSGPIYD  
KTYAGGRLGLFVFSQEMVFFSDLKYECRDP



Figure 1D

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## HT2143 Report

### RECORD INFORMATION

Gene ID: 2081  
 Sequence ID: 2143  
 Protein ID: 2125  
 Sequence name: thrombospondin 4  
 Genome: nucleus  
 Taxon: Homo sapiens  
 Locus: 2081  
 Common Name: thrombospondin 4  
 Role ID: 40

Coding sequence length: 2886 nt  
 Transcript sequence length: 3074 nt  
 Expression data: THC168897

### ACCESSION DATA

HT2143 is derived from accessions(s):

SP:P35443 (THROMBOSPONDIN 4 PRECURSOR.)  
GB:Z19585 (thrombospondin-4 {Homo sapiens})  
GB:Z19585 (H.sapiens mRNA for thrombospondin-4)  
PIR:A55710 (thrombospondin 4 precursor - human)

### cDNA FEATURES

Feature	End 5	End 3
coding_seq	28	2913
3'UT	2914	3074

### SEQUENCE

nucleotide:

```

gaattccggggagcaggaagagccaacatgctggcccccgcggagccgcccgtcctcctg
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gaccttctcccatcttccagtcagaggctaaacccaggcgcctctgctgccagtcctgaca
gaccccgccctgaatgatctctatgtgatttccaccttcaagctgcagactaaaagtcca
gccaccatcttcgggtcttactcttcaactgataacagtaaatattttgaatttactgtg
atgggacgccttaagcaaagccatcctccgttacctgaagaacgatgggaaggtgcatttg
  
```

Figure 2A

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 gaccttctcccatcttccagtcagaggctaaacccagggcgtctgctgccagtcctgaca  
 gaccccgccctgaatgatctctatgtgatttccaccttcaagctgcagactaaaagtca  
 gccaccatcttcggtcttactcttcaactgacaacagtaaatattttgaatttactgtg  
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 gtggttttcaacaacctgcagctggcagacggaaggcggcacaggatcctcctgaggctg  
 agcaatttgcagcgagggggcggctccctagagctctacctggactgcatccaggtggat  
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 gtccgttgggtgagatggctatatctgtggaaaggatgtggacatcgacagttacccc  
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 cctggcattcagctcaaggctgtgaagtctaagacaggtccaggggagcatctccggaac  
 tccctgtggcacacgggggacaccagtgaccaggtcaggctgctgtggaaggactccagg  
 aatgtgggctggaaggacaaggtgtcctaccgctggttctacagcacaggccccaggtg  
 ggctacatcagggtacgattttatgaaggctctgagttgggtggctgactctggcgtcacc  
 atagacaccacaatgcgtggaggccgacttggcgttttctgcttctctcaagaaaacatc  
 atctggtccaacctcaagtatcgctgcaatgacaccatccctgaggacttccaagagttt  
 caaaccacagaatttcgaccgcttcgataattaaccaaggaagcaatctgtaactgcttt  
 tcggaacactaaaaccatatatattttaacttcaattttcttttagcttttaccacccaa  
 atatatcaaacgttttatgtgaatgtggcaataaaggagaagagatcatttttaaaaa  
 aaaaaaaaaaaaaa

**protein:**

MLAPRGAAVLLHLVLQRLAAGAQAATPQVFDLLPSSSQRLNPGALLPVLTDPALNDLYV  
 ISTFKLQTKSSATIFGLYSSTDNSKYFEFTVMGRLSKAILRYLKNDGKVHLVVFNNQLA  
 DGRHRIRILLRLSNLQRGAGSLEYLDLCIQVDSVHNLPRAFAGPSQKPEITELRTFQRKPQ

Figure 2B

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ACDSCP DVSNPNQSDVDNDLVGDS CDTNQSDGDGHQDSTDNCPTVINS AQLD TDKDGIG  
DECDDDDNDGIPDLVPPGPDNCRLVPNPAQEDSNSDGVGDICESDFDQDQVIDRIDVCP  
ENAEVTLTDFRAYQTVGLDPEGDAQIDPNWVVLNQGMEIVQTMNSDPGLAVGYTAFNGVD  
FEGTFHVNTQTDDDYAGFIFGYQDSSSFYVVMWKQTEQTYWQATPFRAVAEPGIQLKAVK  
SKTGPGEHLRNSLWETGDTSDQVRLWKS RNVGWKKVSYRWFLQHRPQVG YIRVRFYE  
GSELVADSGVTIDTTMRGGRLGVFCFSQENI IWSNLKYRCNDTIPEDFQEFQTQNFDRFD  
N



Figure 2C

Poly ID	Sequence ID	Position	Gene Description	Flanking Seq	Mutation Type	Ref NT	Alt NT	Ref AA	Alt AA
G334u4	HT:HT1220_mRNA	2110	THBS1, thrombosp- ondin 1	TGGATGGCTGGCCCA[A/G]TGA GAACCTGGTGTG	Missense	A	G	N	S
G355u2	HT:HT2143_mRNA	1186	THBS4, thrombosp- ondin 4	GAGTGTGAAATGGA[G/C]CGT GCGTTCCCAACT	Missense	G	C	A	P

Figure 3

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